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Soil Health Card (SHC): Its importance and Uses

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Abstract:

Government of India has launched soil health card scheme on 19th February, 2015 to issue soil health card to the farmers under the scheme. Under this programme, the government plans to issue soil card to farmers to help them get a good harvest by studying the quality of soil. According to the scheme, the objective is to issue the soil cards to about 14 crore farmers spread all over it carries crop-wise recommendations of nutrients and fertilizers required for the individual farms to help farmers to improve crop productivity through judicious use of inputs. For getting this information all soil samples are to be tested in various soil testing labs across the country. Thereafter the experts will analyze the strength and weaknesses (micro-nutrients deficiency) of the soil and suggest measures to deal with it. The result and suggestion will be displayed in the cards. Soil health card is useful in maintain the soil fertility and plant nutrient supply at an optimum level for sustaining the desired productivity.

Introduction:

According to the Department of Agriculture & Farmers Welfare, the agricultural and allied industry employs 54.6% of the total labour force. India's economy is heavily reliant on agriculture. Thus, the Indian government has adopted a number of measures to ensure its sustainable growth. One of these measures is the Soil Health Card Scheme that helps farmers to determine the soil quality and gain profitable results from their agricultural produce. The soil health card (SHC) is a complete evaluation of the quality of soil right from its functional characteristics to water and nutrients content and other biological properties. It includes corrective measures that a farmer should adopt to obtain a better yield. The SHC helps the farmers as to get crop-wise recommendations of nutrients and fertilizers required in each type of soil, by a well monitored report about the soil and are guided by experts to improve soil health leading to increased crop yield. Soil Health Card is to issue to farmers at least once in 3

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years. Soil Health Card contains the status of soils with respect to 12 parameters, namely-N, P, K (Macro-nutrients), S (Secondary-nutrients), Zn, Fe, Cu, Mn, B (Micro-nutrients) and pH, Electrical Conductivity, Organic Carbon (Physical Parameters). It not only provides the status but also provides crop wise fertilizer recommendations. It will also contain corrective measures that a farmer should adopt to obtain a better yield.

Soil Health Card:

Soil Health Card (SHC) is a document that tells farmers about their soil. It gives information about the soil's physical, chemical, and biological properties.

- The SHC also provides recommendations on what farmers can do to improve their soil.
- It helps farmers make better decisions about using fertilizers and managing nutrients.
- Soil samples from farmers' fields are analyzed to create the SHC.
- The SHC helps farmers know how to take care of their soil and grow better crops.
- Information regarding Soil Fertility
- Dosage of fertilizer application in crops.
- Information on soil amendments of acidity, saline or alkaline soil; and
- Recommendation on integrated nutrient management

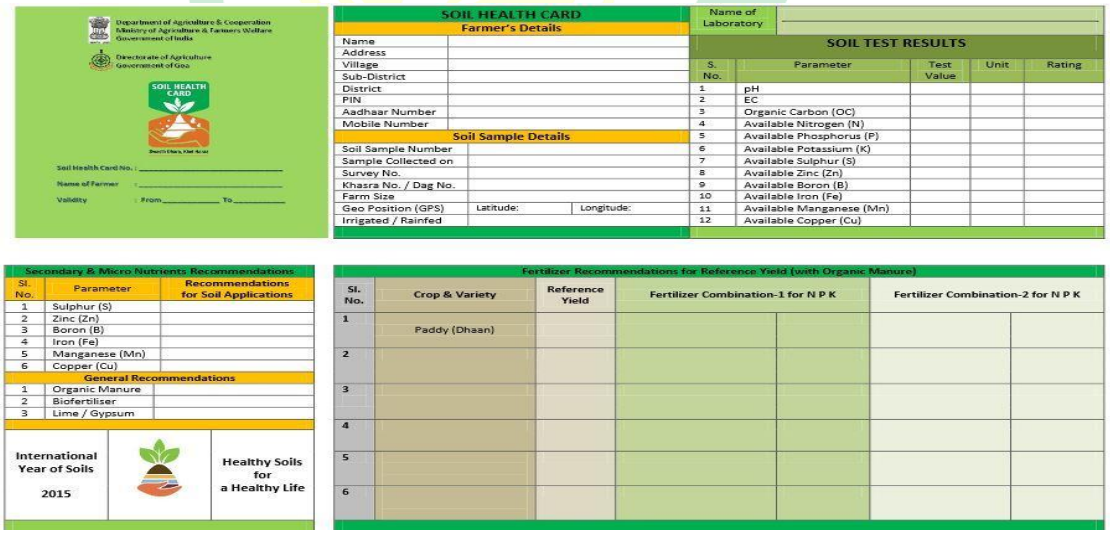

Fig.1 Soil Health Card

Uses of a SHC:

Here are some ways that farmers can use a SHC:

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- The SHC can help farmers to choose crops that are well-suited to the nutrient status of their soil.
- The SHC provides recommendations for fertilizer application based on the nutrient status of the soil.
- The SHC may also recommend soil amendments, such as compost or manure, to improve soil health.

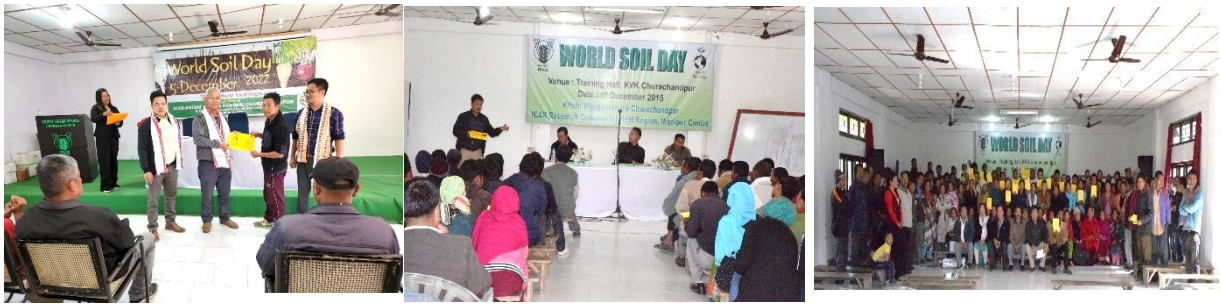

Plate.1 Distribution of Soil Health Card in World

Table 1. Parameters in Soil Health Cards and their critical limits:

S. No.	Parameters	Limits		
		Low	Medium	High
1.	pH (1:2)	< 6.5 Acidic	6.5-7.0 Neutral	> 7.0 Alkaline
2.	EC (1:2)	< 4.0 (Normal)	> 4.0 (Saline)	
3.	OC (%)	< 0.50	0.50-0.75	> 0.75
4.	N (kg ha-^{1})	< 280	280-560	> 560
5.	P (kg ha-^{1})	< 10	10-25	> 25 6
6.	K (kg ha-^{1})	< 120	120-280	> 280
7.	S (mg kg-^{1})	< 10 deficient	>10 sufficient	
8.	Zn (mg kg-^{1})	< 0.6 deficient	> 0.6 sufficient	
9.	Cu (mg kg-^{1}))	< 0.2 deficient	> 0.2 sufficient	
10.	Fe (mg kg-^{1})	< 4.5 deficient	> 4.5 sufficient	
11.	Mn (mg kg-^{1})	< 2.0 deficient	> 2.0 sufficient	
12.	B (mg kg-^{1})	< 0.5 deficient	> 0.5 deficient	

Advantages of SHC:

- With the issue of the card, the farmers will get a well-monitored report of the soil which is chosen for cultivation of crops.
- The monitoring will be done on a regular basis.

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- The farmers will be guided by experts to come up with solutions to improve the quality of the soil.
- Regular monitoring will help the farmers to get a long-term soil health record and accordingly can study and evaluate the results of different soil management practices.
- This card can become most helpful and effective when filled out regularly by the same person over a period of time.
- The idea is not to compare the varied soil types but to find out methods to improve soil fertility, to access the different types of soil and their ability to support crop production in spite of their limitations and as per their abilities.
- The soil card will help the farmers to get an idea on the crop-wise recommendations of nutrients and fertilizers required in each type of soil. This can help in increasing the crop yield.

Objectives Soil Health Card Scheme:

Objectives of scheme Soil Health Card are as follows:

- To issue soil health card to all the farmers of the country every 3 years, so as to provide all the information regarding nutrient deficiencies in fertilization practices.
- To strengthen the functioning of Soil Testing Laboratories (STLs) through capacity building, involvement of agriculture students and effective linkage with Indian Council of Agricultural Research (ICAR)/State Agricultural Universities (SAUs).
- To diagnose constraints related to soil fertility with standardized sampling procedures uniformly across the states. Analyzing and designing block level fertilizer recommendations in targeted districts.
- To develop and encourage soil test based nutrient management in the area for enhancing nutrient use efficiency
- To build capacities of area level staff and of progressive farmers for promotion of nutrient management practices.

Challenges with SHC scheme:

Following is the list of challenges of the SHC scheme.

1. There is a low number of soil testing labs and centres compared to the number of farms.
2. The main focus of the Soil health card is the chemical nutrients required for the soil.

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3. Factors like depth, colour and texture, cropping history slope, microbial activity in the soil, and water retention are not indicated on the Soil Health Card.
4. Language barriers between scheme officials and farmers.
5. Less number of Development Communications Specialists that can help farmers understand the advised procedures.
6. Lack of awareness about the Soil Health Card Scheme among farmers.
7. No distribution campaigns before important seasons like sowing or harvesting to aid farmers produce better.

Soil Testing:

Soil is directly related to the health of individual and therefore to the health of a locality, division, district, state and ultimately the nation. Soil analyses can help to form the basis of a sound soil fertility and plant nutrition programme. Soil nutrient deficiencies decrease soil quality and increase the risk of plant stress, poor yield and susceptibility of crop plants to both pest and diseases. Soil analysis is the foundation of a rational and efficient use of soil amendments and fertilizers that may help to develop progressive agricultural soil and at the same time avoid the problems associated with overuse of fertilizers.

The objective of the soil testing is:

1. A soil test provides current quantitative information on the nutrient content and the nutrient supplying capacity of a soil.
2. To predict the probability of obtaining a profitable response to lime and fertilizers and the amount to apply.
3. To evaluate the fertility status of soils on a village, soil area or state wide basis by the use of soil test summaries.
4. Formalization of quantitative information for soil fertility map.
5. Data in regard to change in soil fertility due to regular use of mineral and organic manures as well as chemical amendments.
6. Increase knowledge of how various farming practices and crop rotation affect soil test trend over time and across large areas.
7. Soil testing allows for periodic monitoring of soil chemical properties in order to maintain the soil nutrient levels within the established optimal ranges and may serve as an accurate indicator of nutrient depletion or accumulation.

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8. Continue to add information each year and begin more detail analysis of the records to refine the site-specific nutrient management.
9. Specialized testing may be used for specific soil nutrients of concern.

Collection of soil sample:

The following steps are followed to collect the representative soil samples for testing.

1. Equipment's required for the sampling are spade, auger, polythene bucket, and scale.
2. Clean the site (with spade) from where soil sample is to be collected.
3. Select the sites at random (20-30) in a zigzag (or criss- cross) manner (Fig.1) of cultural operations and natural trends of change such as slope to represent the whole sampling area adequately.
4. Dig soil with spade to 0-15 cm depth.
5. Take out the soil- slice of ½ inch thick from both the exposed surface of the pit from top to bottom. To collect the soil-slice spade may be use.
6. Collect the soil samples in a polythene bucket.
7. The core should be of same volume and represent the same cross section of the sampling volume.
8. The soil unit selected for one composite sample should be homogeneous for the objective of the analysis.
9. Document the complete laboratory form in respect of
    - Location of sample/field
    - Date
    - Crop previously grown and/or those to be grown
    - Sample depth
    - Specific type of analysis requested
    - Observations of plant growth responses, if problems

Recommended doses of fertilizers on soil test basis after testing:

It is observed from various studies across the country that indiscriminate use of chemical fertilizers by farmers with a view to increase the crop yield is a common problem, which has led to deterioration of soil structure, wastage of nutrients, destruction of soil micro-organisms, and scorching of plants at the extreme cases. A proper soil test will help ensure the application of fertilizers to meet the requirements of the crops while taking advantages of

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nutrients already present in the soil. In this regard, Government of India had undertaken initiatives to ameliorate the situation and encourage the farmers for balanced use of fertilizers. Therefore, an effort was made with this study to understand the level of awareness on soil testing, and the use of recommended doses of fertilizers by the farmer.

Application of recommended doses of fertilizers by soil test farmers:

Application of recommended fertilizers mentioned on soil health card is very crucial for sustainable intensification and increasing crop productivity. The application of recommended fertilizers is influenced by many factors like, awareness of farmers about advantages in applying recommended doses of fertilizers, availability of fertilizers, convenience, sources of purchase of fertilizers, weather condition and time of fertilizer application etc**.**

Conclusion:

SHC recommendation-based fertilizer application has multiple benefits like enhanced soil quality, production of nutritious food, climate change mitigation along with reduction in water pollution due to chemicals etc. Also, collaborative efforts of government and non-government agencies in the promotion of SHC based balanced fertilizer recommendation make farmers aware about its importance for the progress of Indian farming system. Soil testing is a great tool to assess soil fertility and nutrient supplying capacity. The most crucial step in the whole programme is timely reporting of soil test results to farmers. Thus, it can be said that our 'New India' is inching closer to the dream of 'Doubling the Farmer's Income'. Soil Health Cards are ushering in the new era of healthy soil management in the country, especially ending the menace of overuse of urea or nitrogenous fertilizers.

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