



Soil Health Card improving the Soil Health and Crop Yield

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INTRODUCTION

Sustainable agriculture is solely dependent on soil health. Soil health is the integration of three components (physical, chemical and biological processes) and their functions in the soil. The continuous cultivation and intensive cropping have resulted in loss of soil by erosion and decrease in organic matter. Hence, soil health needs to be assessed at regular intervals so as to ensure that farmers applied only required nutrients. In order to do this, there is a need to introduce soil health card which is a tool to help the farmers to monitor and improve soil health.

The Soil Health card (SHC) scheme was launched 6 year ago by Prime Minister Narendra Modi on February 19, 2015 at Suratgarh, Rajasthan. Prime Minister Narendra Modi said on the occasion of the Soil Health Card Scheme that the farmers should know the current health status of their farm soil. Priminister Narendra Modi emphasized the fact that if the soil will not be healthy then farm production will hamper (Reddy, 2017). Soil Health Card (SHC) is a Government of India's scheme, which is promoted by the Department of Agriculture & Co-operation under the central Ministry of Agriculture and Farmers' Welfare. It is being implemented and started on the baseline of Agriculture through the Department of Agriculture of all the State government and Union Territory Governments. A Soil health card represents the actual status of soil fertility of the field and is promoted to advise which fertilizer and manures are applied and also the needed soil amendments and management practices adopted for maintaining soil health and sustainable crop production (Chouhan et al., 2017). Soil health card is a test report of farmer field soil. Under the soil health card the 12 parameters are analyzed like major nutrient as Nitrogen (N), phosphorus (P), potassium (K) and micronutrient; Zinc (Zn), iron (Fe), Copper (Cu), Manganese (Mn), Boron (Bo) and chemical parameters as Soil nature (pH), electrical conductivity (EC) and organic carbon (OC).

Based on these parameters, the Soil Health Card will indicate fertilizer doses recommendations and soil amendment practices required for the farm field. Soil health cards are generated every year and show the changes in the nutrient status of field and soil health. The SHC is a tool to help the farmer to monitor and improve soil health on their own field test report. Regular use will allow them to record long term trends in soil properties changes and to assess the effects of adopting different soil management practices on fields during cultivation (Gupta et al., 2019). SHC is most effective when the same field is sampled and analyzed consistently by the same discipline and unit and person over the time. The purpose of soil health cards is assessing each soil's ability to support crop production within its capabilities and site limitations. The soil testing provides a scientific tool to evaluate soil fertility status and recommendation for balanced fertilization to crops (Biswas, 2002).

How the Soil health cards help the farmers?

- Soil health card is a well monitored report of soil of farmer field and suggest to farmers which is chosen for cultivation of crops.
- Soil health cards suggest to farmers the recommendation of fertilizer doses and crop management practices.
- Year wise report of soil health card showed the changes in the soil properties of farmers during cropping.
- The changing in soil properties gives which cropping system is adopted by farmers for sustaining the soil health and better crop yields.
- Regular monitoring of soil of farmer field will help the farmers to get a long-term soil health results and accordingly farmers assess the what is need of soil and crop.
- Soil health card can become most helpful to farmers and effective when that is regularly maintained and monitored by the same person over a period of time.

- Soil health card gives the idea 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 by adopting the recommended practices and suggestions.
- Regularly Farmers get detailed information about soil health of farm field.
- 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.
- Soil health card save the money of farmers and increase the profit through adopting useful need based practices.
- Farmers realize the fertile strength, status and capacity of their farm soil through Soil Health Card. This day highlights all these benefits to the farmers. It is also important to know the type of soil. Mostly, three kinds of soil land are found in India - Saline, Alkaline and Acidic.

Causes of soil health deterioration:

1. Washing away of top soil and organic matter associated with finer soil fractions due to water erosion resulting in a 'big robbery in soil fertility.
2. Water logging, salinity and alkalinity and formation of degraded soils.
3. Intensive deep tillage and inversion tillage with moldboard and disc plough resulting in (i) fast decomposition of remnants of crop residues, (ii) breaking of stable soil aggregates and aggravating the process of oxidation of entrapped organic carbon, and (iii) disturbance to the habitat of soil micro flora and fauna and loss in microbial diversity.
4. Excessive removal of plant available nutrients through intensive cropping without adequate additions or replenishment by way of manures or fertilizers and finally resulting in poor soil fertility.

5. Mono cropping without following any suitable rotation. Exclusion of legumes from the crop rotation also leads to decline in fertility.
 6. Use of moderately high doses of primary nutrient fertilizers (N, P, K) especially under irrigated conditions without giving due consideration to secondary (Ca, Mg, S) and micronutrients (Fe, Mn, Zn, Cu, Mo, B) leading to imbalance in nutrient status in soil.
 7. No or low use of organic manures such as FYM, Compost, Vermicompost.
 8. No recycling back of farm based crop residues because of complete removal of crop residues from fields for animal fodder, and also burning of stubbles for ensuring clean cultivation for next crop.
 9. No green manuring as it competes with the regular crop for date of sowing and other resources especially under rainfed or moisture stressed environments.
 10. Nutrient losses due to leaching, volatilization and gaseous emissions occurring due to non precise and faulty methods of application also leads to poor soil fertility and deteriorates soil quality.
 11. Excessive use of agricultural inputs such as fertilizers, herbicides, pesticides, fungicides etc. in some of the commercial crops also result in poor soil and water quality.
 12. Mining and other commercial activities such as use of top soil for other than agricultural purpose have also taken a toll on soil quality.
 13. No attention paid on soil biota's which are vital to soil functionality in terms of nutrient mineralization and solubilization.
- Strategies for managing soil health for sustainable agriculture:**
1. Prevention of degraded and polluted soil resources through sound eco-friendly and cost-effective technology.
 2. Restoration of biological activity of soils through amelioration of polluted and degraded soils.
 3. Soil testing is the back bone of soil health indicators. Nutrient recommendations must be on the soil test basis.
 4. Proper understanding of soil-water-nutrient-plant relationships and enhancing soil productivity is the key to good soil health.
 5. Efficient water management in the canal-irrigated areas to arrest soil salinization, soil sodification and waterlogging.
 6. Judicious integrated plant nutrient management (IPNM) including the use of chemical fertilizers, organic manures, green manures, crop residues, organic wastes, biofertilizers and upgradation of soil organic carbon (SOC) content for maintaining soil health.
 7. Preparation of suitable models to predict the likely changes in soil health/soil quality, consequent to varying land use and management practices.
 8. Increasing use efficiency of key inputs such as nutrients/ water as well as total factor productivity.
 9. Proper selection of crops, cropping sequence with inclusion of legumes and land uses according to soil capability.
 10. Development of criteria for assessing various degrees of soil health under different agro-ecological systems.
 11. Regular nutrient monitoring in different production systems under a given agro-ecological situation and timely employment of corrective measures to maintain good soil health for sustainable productivity.
 12. Soil micronutrients are a finite resource. Micro-nutrient computation should be strictly on soil test basis for different cropping systems. Zinc is the most limiting micronutrient followed by Fe, Mn and B. Among the intensive cropping systems, cereal-cereal based system appears to be most exhaustive. Micronutrient applications in balanced

doses are gaining momentum due to their deficiency / imbalance in soil.

13. Mass awareness among the farmers about the significance of soil health and the serious hazards resulting from its misuse is an essential prerequisite.
14. There is a need to develop soil health cards covering important visible and understandable indicators so that even illiterate farmers should be able to use them periodically.

CONCLUSION

Soil health card is a systematic tool for sustaining the crop production and soil health. It is recommended the requirement of crop for higher yield in balanced manner and protects the environment. It is provide the farmers better health issues and suitable amendment and management practices for improvement the crop yields and soil health in sustainable agriculture.

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