

# Sustainable Farming Practices: Soil Health Cards as a Tool- A book Chapter

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**Abstract**— The Indian economy and society depend heavily on agriculture. Approximately two thirds of the nation's people make their living either directly or indirectly from agriculture. The innovations of the Green Revolution in the 1960s made it possible to achieve food production self-sufficiency and transformed a nation experiencing a food deficit into one experiencing a food surplus. This resulted in a rebirth of agriculture centred on the adoption of intensive farming supported by the use of manures, fertilisers, pesticides, and assured irrigation, as well as high-yielding seed varieties. Chemical fertilisers were more well-liked by the high-yielding cultivars, and they eventually became a staple of Indian agriculture. Water conservation and effective usage, as well as soil health maintenance, are critical to the future food security of the planet. The largest source of nutrients for humans still comes from soils. Soil health is a direct indicator of human health.

The focus of agricultural research has shifted recently to emphasize both food and nutritional security. The primary cause of the imbalance is thought to be the overuse of N fertilisers and the relatively low use of P and K fertilisers. In addition, India's fertilizer use has been rising over time. Nurturing the soil has become essential to improve its health and productivity. The Indian government introduced the soil health card programme in this regard. This is intended to encourage the implementation of fertiliser recommendations based on soil tests, which will help to sustainably maintain soil productivity while simultaneously increasing crop production.

**Keywords**— Agriculture, Indian Agriculture, Soil Health, Soil Testing, Soil Fertility, Soil Nutrition, Sustainable Agriculture, Food Security, Nutritional Security.

## I. INTRODUCTION

The Soil Health Card scheme was launched by Government of India in 2015 and is endorsed by the Department of Agriculture and Co-operation under the Ministry of Agriculture and Farmers Welfare, Government of India. Under the programme, farmers receive soil health cards (SHCs) from the government that include crop-specific recommendations for the nutrients and fertilisers needed for every individual land holding. The goal of this is to assist farmers in increasing output by using inputs wisely. The Soil Health Card Scheme offers a qualitative evaluation of soil health and the necessary reclamation actions for soils which cause problems.

In addition to providing information on the specific nutritional status of each farmer's soil, the soil health card makes recommendations regarding the amount of fertiliser and soil amendments each farmer should use to preserve the long-term health and productivity of his or her soil. The programme aims to provide around 14 crore farmers nationwide with soil health cards every three years. It is being implemented through the Department of Agriculture of all the State and Union Territory Governments.

### 1.1 The stated objectives of soil health card scheme are as follows:

- To provide soil health cards, every three years, to all farmers in the nation, containing all the information related to fertilisation procedures that address nutritional deficiencies.
- To improve the functioning of Soil Testing Laboratories (STLs) by enhancing their capacity, including agricultural

students, and establishing a strong connection with the State Agricultural Universities (SAUs) and Indian Council of Agricultural Research (ICAR).

- To diagnose soil fertility-related limitations using universally standardised sample methodologies across all states.
- Examining and creating fertiliser suggestions at the block level in the districts that are being targeted.
- To develop and encourage soil test based nutrient management in the area for enhancing nutrient use efficiency
- To strengthen the ability of innovative farmers and employees at the area level to promote nutrient management techniques.

### **1.2 The unique features of SHC scheme are:**

- ✓ Single, uniform, web-based software for generation of Soil Health Card in uniform format across the country in 22 local languages
- ✓ Sample tracking and alerts to farmers through SMS
- ✓ Automatic Fertilizer Recommendation calculations and micronutrient suggestions
- ✓ Fertilizer recommendations for Horticultural crops, based on age/ crop stage of the crop
- ✓ Organic carbon based fertilizers recommendations
- ✓ National database on soil health
- ✓ Dashboard
- ✓ Linkages to land record applications of states
- ✓ Integration with Common Service Centre (CSCs) portal for CSCs to enter data
- ✓ Interface for displaying Soil Health Card in Umang and Krishi Suvidha mobile Apps
- ✓ Various types of nutrient status reports
- ✓ Calculator for fertilizers dosages
- ✓ Success stories

## **II. SOIL HEALTH CARD PORTAL**

The Soil Health Card Portal (<http://soilhealth.dac.gov.in>) project was launched by Hon'ble Minister of Agriculture & Farmers Welfare on 15th July, 2015. The Soil Health Card Application is a work flow-based technology created by the National Informatics Centre that makes it easier for farmers nationwide to generate Soil Health Cards in a consistent and standardised manner. Soil samples are collected from fields of farmers on grid basis; 10 ha grid in rainfed areas and 2.5 ha grid in irrigated areas. The concerned officials record the samples' data and location details in the Application site, and an ID is produced specifically for each soil sample.

The developed mobile application can also be used to send the sample details. The mobile application automatically measures the latitude and longitude of the location where samples are taken, ensuring the accuracy of the data and the validity of the sample collection. Mobile application does not require net connectivity during sample details entry from the fields. As soon as internet connectivity is established, data is pushed and stored on the server.

The samples are tested in the labs and the test results are entered by the respective Soil Testing Lab officials. Based on the available nutrients in the soil, the crop-wise required quantity of nutrients are calculated using Soil Testing Crop Response developed by ICAR method or General Fertilizer Recommendations given by State Governments/ SAUs (State Agricultural Universities). The application then computes the appropriate crop-wise fertiliser quantities based on the required nutrients and prints the results on the Soil Health Card. The card also suggests the soil amendments that are required to eradicate micronutrient deficits.

## 2.1 Soil Health Card:

A soil health card is an in-depth report designed for a particular field that details the fertility status of the soil along with other significant soil factors that impact crop productivity. In addition to information on soil health, it also offers recommendations for applying fertilisers and amendments based on soil tests. Details in a Soil Health Card include-

- ✓ Information regarding Soil Fertility.
- ✓ Dosage of fertilizer application in crops.
- ✓ Information on soil amendments of saline or alkaline soil.
- ✓ Recommendation on integrated nutrient management.

## 2.2 How and where to get the Soil Health Cards

Farmers can simply bring representative soil samples from their farms to the closest Krishi Vigyan Kendra or State Agriculture University District Soil Testing Laboratory (STL). The sample can also be deposited to the Agriculture supervisor, Assistant Agriculture Officer for testing and to obtain the SHC. After analysis of the samples and interpretation, the recommendation made for the particular soil/field by the subject specialist. The State Agricultural University's Krishi Vigyan Kendra soil testing laboratory, along with the district soil testing laboratory, prepare the SHC, which farmers can either collect up in person or can send to their address.

## 2.3 Process of Soil Health Analysis and Distribution of Soil Health Cards

### 1. Norms for Sampling

- ✓ Soil samples are drawn in a grid of 2.5 ha in irrigated area and 10 ha in rain- fed area with the help of GPS tools and revenue maps.

### 2. Collection of Soil Samples

- ✓ Soil samples are typically collected twice a year, following the harvesting of the Rabi and Kharif crops, respectively, or when there is no standing crop in the field.
- ✓ The sample is collected by the State Government using personnel from their Department of Agriculture or an external agency. The local agriculture and science college students may also be involved by the state government.
- ✓ Soil Samples are collected by a trained person from a depth of 15-20 cm by cutting the soil in a “V” shape. A portion of it is often taken as a sample after being fully mixed and collected from the field's four corners and centre.
- ✓ The selected samples are coded and sealed in a bag. The soil test laboratory receives it after that for examination.

### 3. Soil Testing

- ✓ Soil samples are tested as per the approved standards for all the 12 parameters.

### 4. Soil test report and printing SHC Portal

- ✓ After analysis, test results and relevant recommendations are uploaded into SHC portal ([www.soilhealth.dac.gov.in](http://www.soilhealth.dac.gov.in)). The reports are available to the general public.
- ✓ Information on the progress of collecting and distributing soil samples, MIS reports, studies focused on farmers, Soil Maps, technical documentation and recommendations, access to mobile applications, and more are available on the SHC Portal.

## III. SOIL HEALTH CARD MOBILE APPLICATION:

Soil Health Card Mobile application was launched on the occasion of World Soil Day – 5th December 2017 in *Jhajjar*, Haryana. This app was developed by *Krishitantra*, is a useful tool for managing soil health data, collecting soil samples, and conducting testing for Village Level Entrepreneurs (VLEs) and Soil Testing Laboratories (STLs).

- ✓ It makes visiting farmers' locations and scanning QR codes for soil sample collection easier. This guarantees precise sample collection while streamlining the procedure.
- ✓ It facilitates simple farmer registration and plot surveying, giving users the ability to effectively monitor and control the status of soil samples.
- ✓ It integrates with third-party soil-test service providers, enabling users to conduct tests using their preferred provider's apps. Subsequently, the soil test findings can be effortlessly entered into the system by government laboratories, guaranteeing smooth data administration.
- ✓ In addition, it provides a number of other helpful features like access to FAQs and user manuals, the ability to submit and track claims for soil testing services, and bilingual support.

### 3.1 Progress of SHC Scheme:

- In Cycle- I (2015 to 2017), 10.74 crore and in Cycle- II (2017 to 2019), 12.19 crore grid based Soil Health Cards have been distributed to farmers.
- In Model Village Programme (2019-20), 23.71 lakh and during the year 2020-21, 11.52 lakh land holdings based Soil Health Cards have also been distributed to farmers.

The "Development of Model Villages Programme (MVP)" pilot project was launched in 2019–20, which came after cycles I and II of the Scheme. Under this project, farmers were encouraged to work together to collect samples and evaluate their potentially cultivable soil. One village per block was adopted for land holding based soil testing and organization of larger numbers of demonstrations in the adopted villages.

### 3.2 Soil Health Card (SHC) Scheme progress in year 2023-2024:

Since, 2014-15, total 8272 Soil Testing Labs (1068 Static Soil Testing Labs, 163 Mobile Soil Testing Labs, 6376 Mini Soil Testing Labs and 665 Village Level Soil Testing Labs) have been established across the country.

- Challenges with Soil Health Card Scheme
- Inadequate soil testing infrastructure.
- The Soil Health Card does not include microbiological activity or moisture retention, two crucial components.
- Many farmers are unable to comprehend the information and, as a result, are unable to implement the advised procedures.
- A few crucial indications are missing, such as agricultural history, soil moisture or water resources, soil colour and texture, slope, depth, and microbiological activity.
- A lack of coordination between farmers and agricultural extension agents.
- Soil variability has no bearing on the number of soil samples per unit area.
- Only soil colour is listed under physical and biological attributes on the soil health card, which focuses mostly on chemical nutrient indicators

Soil Health Card scheme has been merged in Rashtriya Krishi Vikas Yojana (RKVY) cafeteria scheme as its one component under name 'Soil Health & Fertility' from the year 2022-23.

## REFERENCES

- [1] Charel J. M., Parmar V. S. and S. G. Bariya .(2024).Extension strategy for overcome constraint faced by the farmers in adoption of Soil Health Card. *Indian Farmer*. 11(1): 52-55.
- [2] Chouhan, R. S., Sharma, H. O., Rath, D., and Niranjana, H. K. (2017). Impact of Soil Health Card Scheme on Farmers' Income—A Case Study of Kharif Crops in Madhya Pradesh. *Agricultural Economics Research Review*.30:139-141.
- [3] Circular of implementation of Soil Health Card Government of India Ministry of Agriculture and Farmers Welfare Department of Agriculture and FarmersWelfare  
<https://www.soilhealth.dac.gov.in/assets/Circular%20of%20implementation%20of%20Soil%20Health%20Card>

- [4] Kumar, S. Pandurang A. K., Pratibha B. T. (2019). Awareness about Soil health card and constraints faced by farmers in utilising its information in Southern Maharashtra. *Indian Journal of Extension Education*. 55(3):173- 176.
- [5] Meenia, Puja and Kethavath, N. (2022). Swasth Dhara, Khet Haraa, Healthy Earth, Green Farm. 7:7-9.
- [6] Moharana, P., Jena, R. and Yadav, B. (2023). Digital mapping of soil health card parameters and nutrient management zones in the Thar Desert regions of India using quantile regression forest techniques. *Arabian Journal of Geosciences*. 16:560.
- [7] Parewa, H., Jain, L. and Mahajan, G. and Bhimawat, B.S. (2016). Soil Health Card: A Boon for the Indian Farmers. *Indian Journal of Plant and Soil*. 3(2):77-81.
- [8] Patel, G. G., Lakum, Y. C., Mishra, A., and Bhatt, J. H. (2017). Awareness and knowledge regarding soil testing and utility perception of soil health card. *International Journal of Current Microbiology and Applied Sciences*. 6(10):329-334.
- [9] PIB Delhi. (2023). Soil Health Management and Soil Health Card Schemes  
[https://pib.gov.in/PressReleasePage.aspx?PRID=1988294#:~:text=So%20far%2C%2023.58%20crore%20soil,Krishi%20Vikas%20Yojana%20\(RKVY\)](https://pib.gov.in/PressReleasePage.aspx?PRID=1988294#:~:text=So%20far%2C%2023.58%20crore%20soil,Krishi%20Vikas%20Yojana%20(RKVY).).
- [10] Purakayastha, T. J., Pathak, H., Kumari, S., Biswas, S., Chakrabarty, B., Padaria, R. N., and Singh, A. (2019). Soil health card development for efficient soil management in Haryana, India. *Soil and Tillage Research*. 191:294-305.
- [11] Raaj, A. and Jahanara. (2017). Profile of farmers and attitude towards Soil Health Card Scheme: A measure for the maintenance of soil health. *International Journal of Research Culture Society*. 1(10):194-196.
- [12] Rani A, Saha JK and Patra AK (2021). Soil Health Card: A Step towards Sustainable Agriculture. *Harit Dhara*. 4(1): 26.
- [13] Reshmi S. (2017). Utilization of soil health cards by the farmers towards of Thrissur District (Master Thesis, KAU).
- [14] Shome, S. (2021). Analysis of Soil Health Card Scheme. 10.13140/RG.2.2.29028.50569.
- [15] Singh, J. and Negi, A. (2020). Soil health card: An overview. 10.22271/ed.book.743.
- [16] Singh, L. S., Kumar, M.P., Roma, S. (2024). Soil Health Card (SHC): Its importance and Uses. *Just Agriculture* (e-magazine). 4(8):285-292.
- [17] **Government of India**, Ministry of Agriculture and Farmers Welfare, Department of Agriculture and Farmers Welfare.  
<https://soilhealth.dac.gov.in/home>
- [18] <https://www.indiastathealth.com/table/northern-region/agriculture/state-wise-target-and-achievement-of-soil-health-c/1125443>
- [19] Mishra, R., Das, R. <https://soilhealth.dac.gov.in>
- [20] <https://www.researchgate.net/publication/340741286>