Soil Health Card Scheme in India: Farmers' Awareness, Adoption and Challenges – A Comprehensive Review

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Abstract

Soil health plays a critical role in ensuring sustainable agricultural productivity and environmental sustainability. In India, imbalanced fertilizer use, soil nutrient depletion, and declining soil fertility have emerged as major challenges for agricultural development. To address these issues, the Government of India launched the ***Soil Health Card Scheme*** *on 19 February 2015 with the objective of promoting scientific soil nutrient management. The scheme aims to provide farmers with detailed information regarding soil nutrient status and crop-wise fertilizer recommendations based on soil testing. This review paper examines the socio-economic characteristics of farmers, awareness levels, utilization patterns, and constraints associated with the Soil Health Card Scheme. The review indicates that although farmers possess moderate awareness and utilization of soil health cards, several institutional, infrastructural, and socio-economic factors influence adoption. Extension contact, education, occupation, and social participation are positively associated with awareness and utilization levels. However, delays in soil testing, limited access to laboratories, and lack of technical knowledge restrict effective utilization of soil health cards. Strengthening extension services, farmer training programmes, and soil testing infrastructure is essential for maximizing the benefits of the scheme. The review highlights the importance of integrating soil health management with sustainable agricultural development strategies.*

Keywords

Soil fertility, soil testing, agricultural extension, nutrient management, sustainable agriculture, farmer awareness.

1. Introduction

Agriculture is the backbone of the Indian economy and provides livelihood to millions of rural households. However, agricultural sustainability is increasingly threatened by soil degradation, nutrient imbalance, and declining soil fertility. Over the past few decades, the intensive use of chemical fertilizers without proper knowledge of soil nutrient status has resulted in significant deterioration of soil quality in many agricultural regions.

Healthy soil is essential for maintaining crop productivity and ensuring environmental sustainability. Soil health refers to the capacity of soil to function as a dynamic living system that supports plant growth, maintains water quality, and sustains biological diversity. Sustainable soil management practices are therefore necessary for maintaining agricultural

productivity and protecting natural resources.

Recognizing the importance of soil health, the Government of India introduced the **Soil Health Card Scheme** to provide farmers with scientific information regarding soil fertility status. The scheme aims to promote balanced fertilizer use and improve soil nutrient management practices. Soil health cards provide farmers with recommendations regarding fertilizer application based on laboratory analysis of soil samples collected from their fields.

The scheme also contributes to improving crop productivity and reducing unnecessary fertilizer use. By adopting the recommended nutrient management practices, farmers can optimize input use efficiency and reduce environmental pollution caused by excessive fertilizer application.

Despite its potential benefits, the effectiveness of the scheme largely depends on farmers' awareness, accessibility of soil testing facilities, and extension support. Understanding the socio-economic characteristics of farmers and their awareness levels is therefore important for evaluating the success of the programme.

2. Background of the Soil Health Card Scheme

The concept of soil health assessment has been recognized globally as an essential component of sustainable agricultural development. Soil testing helps determine nutrient deficiencies and enables farmers to apply fertilizers in appropriate quantities.

The **Soil Health Card Scheme** was launched by the Government of India in 2015 with the objective of issuing soil health cards to farmers every two years. These cards provide detailed information regarding soil nutrient status and fertilizer recommendations for various crops.

Before the national implementation of the scheme, several Indian states had already initiated soil health card programmes. Gujarat introduced soil health cards in 2003–04, followed by Tamil Nadu in 2006. These initiatives demonstrated the potential of soil testing in improving fertilizer management and crop productivity.

Under the national programme, soil samples are collected from farmers' fields and analyzed in soil testing laboratories. Based on laboratory analysis, soil health cards are prepared and distributed to farmers. These cards contain information regarding macro and micronutrient status, soil pH, organic carbon content, and recommended fertilizer doses.

During the first cycle of the programme between 2015 and 2017, more than 10 crore soil health cards were distributed to farmers across the country. In the second cycle from 2017 to 2019, the number increased further, indicating the large-scale implementation of the programme.

The scheme aims to achieve several objectives including balanced fertilizer use, improved crop productivity, reduced cost of cultivation, and sustainable soil management.

3. Socio-Economic Profile of Farmers

Socio-economic characteristics play a significant role in influencing farmers' adoption of agricultural technologies and government programmes. Factors such as age, education, family structure, occupation, landholding size, and income level affect farmers' decision-making processes.

Studies indicate that the majority of farmers belong to the middle-age group, followed by older and younger farmers. Middle-aged farmers are generally more experienced and actively engaged in agricultural activities.

Education is another important factor influencing farmers' awareness and adoption of agricultural innovations. A large proportion of farmers are literate, which helps them understand information related to soil testing and fertilizer recommendations.

Family structure also affects farmers' participation in agricultural decision-making. Many farmers belong to nuclear families, while others live in joint family systems. Nuclear family systems often allow faster adoption of new technologies because decision-making authority is concentrated within fewer members.

Landholding size is another important determinant of technology adoption. Farmers are categorized as marginal, small, medium, and large farmers based on landholding size. Marginal farmers constitute a significant proportion of the agricultural population in India and often face resource constraints.

Occupation patterns indicate that many farmers combine crop cultivation with animal husbandry activities. Integrated farming systems provide additional income and contribute to livelihood security.

Income level also influences farmers' ability to adopt recommended agricultural practices. Farmers with higher income levels can invest more easily in fertilizers, improved seeds, and agricultural equipment.

4. Farmer's Awareness of Soil Health Cards

Awareness is a key factor determining the success of agricultural development programmes. Farmers must understand the objectives and benefits of a programme before they can adopt it effectively.

Studies reveal that a majority of farmers possess moderate awareness of the **Soil Health Card Scheme**. Many farmers are familiar with the process of soil sample collection and the distribution of soil health cards. However, their understanding of technical information related to nutrient management and fertilizer recommendations is often limited.

Farmers commonly obtain information about the scheme through extension workers, village leaders, fellow farmers, and mass media sources such as television and radio.

5. Utilization of Soil Health Cards

Although awareness levels are moderate, the utilization of soil health cards varies among farmers. Many farmers use the information provided in the cards to guide fertilizer application, while others continue to follow traditional practices.

Factors influencing utilization include education level, extension contact, social participation, and economic motivation. Farmers with better access to extension services are more likely to utilize soil health card recommendations effectively.

6. Constraints in Implementation

Despite the potential benefits of the programme, several constraints limit its effectiveness. Major constraints reported by farmers include:

- Delays in soil sample analysis and card distribution
- Limited availability of soil testing laboratories
- Difficulty in understanding technical recommendations
- High cost of fertilizers
- Lack of training in soil sampling techniques

These challenges reduce the effectiveness of the programme and limit farmers' ability to implement recommended practices.

7. Policy Implications

To improve the effectiveness of the scheme, several policy measures are required. These include expanding soil testing infrastructure, strengthening extension education programmes, and providing training to farmers on soil nutrient management.

Digital technologies and mobile-based advisory services can also be used to

improve dissemination of soil health information.

8. Conclusion

The **Soil Health Card Scheme** represents a major policy initiative aimed at improving soil fertility management and promoting sustainable agriculture in India. Although the scheme has achieved considerable success in distributing soil health cards to farmers, challenges remain in terms of awareness, utilization, and infrastructure.

Strengthening extension services, improving soil testing facilities, and enhancing farmer training programmes will be essential for maximizing the benefits of the scheme and ensuring long-term soil sustainability.

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