# An Exploratory Study to Assess Public Awareness of Soil Health with A Focus on Soil Health Cards and Soil Organic Carbon

**Saswatik Tripathy**
Senior Project Manager
Foundation For Ecological Security, Keonjhar

***Abstract-*** *In the pursuit of sustainable agriculture and environmental conservation, soil health stands as a linchpin. This research probes into the awareness levels among people regarding soil health, with a specific focus on two crucial dimensions: government-issued Soil Health Cards (SHCs) and comprehension of soil organic carbon (SOC). The study, conducted in Nayagarh district of Odisha, India, involving 200 respondents, reveals a dual scenario.*

*While a significant percentage of respondents are aware of SHCs, a notable proportion lacks a practical understanding of their utility, underscoring a knowledge gap. Furthermore, knowledge about SOC, a key determinant of soil fertility and sustainability, remains limited among the populace.*

*To address these gaps, we propose a comprehensive communication model, integrating training programs, multilingual resources, mobile apps, community engagement, and farmer-to-farmer knowledge sharing. By enhancing awareness and knowledge about SHCs and SOC, we aspire to empower farmers and promote sustainable agricultural practices, fostering a prosperous and ecologically responsible future.*

***Keywords***- Soil health, Soil Health Cards (SHCs), soil organic carbon (SOC), sustainable agriculture, awareness, communication model.

## I. INTRODUCTION

In the pursuit of sustainable agriculture and environmental conservation, understanding and enhancing soil health is of paramount importance. Soil health, a multifaceted concept, encapsulates the dynamic interactions between physical, chemical, and biological properties of soil that contribute to its productivity and resilience. This research embarks on an exploratory journey to gauge the extent of public awareness regarding soil health, with a particular focus on two key dimensions: the government-issued Soil Health Cards and the awareness of soil organic carbon.

Soil health in India has deep historical roots, with indigenous farming practices emphasizing a holistic approach that encompasses soil fertility and sustenance. However, the modern agricultural landscape in India has evolved significantly, with the introduction of inorganic farming practices during the 1960's through High Yielding Varity Programme. This transition paved the way for a gradual shift away from traditional methods and towards the use of synthetic chemicals, jeopardizing soil health.

Recognizing the critical need to revitalize soil health, the Indian government launched the Soil Health Card (SHC) scheme. SHCs are designed to empower farmers with vital information about their soil, including nutrient content, pH levels, and recommendations for soil management practices. The SHC initiative represents a crucial intervention in promoting sustainable farming and enhancing soil health. Therefore, this research will examine the extent to which farmers and the general public are aware of the SHC program and its implications for soil management.

Another dimension of soil health crucial to sustainable agriculture is soil organic carbon (SOC). SOC is a key indicator of soil fertility and carbon sequestration potential. It plays a pivotal role in improving soil structure, water-holding capacity, and nutrient availability. However, public awareness regarding the significance of SOC and its impact on soil health remains understudied.

This research aims to bridge this knowledge gap by investigating public awareness levels of soil organic carbon. By conducting surveys, interviews, and analyzing public discourse, I seek to discern the extent of public knowledge about SOC and its role in sustainable agriculture.

This exploratory study will delve into the awareness levels among people regarding soil health, with a special

emphasis on the government's Soil Health Card initiative and the understanding of soil organic carbon. It endeavors to shed light on the role of awareness in shaping agricultural practices and promoting sustainable soil management for a more prosperous and environmentally responsible future.

## II. LITERATURE REVIEW

Soil health stands as a cornerstone in the realm of sustainable agriculture and environmental preservation. It encapsulates the intricate interplay of physical, chemical, and biological forces within the soil matrix, which collectively dictate its capacity for fertility, productivity, and adaptability. In the ever-evolving landscape of agriculture, the cognizance surrounding soil health and its safeguarding has assumed unparalleled significance. In this literature review, I embark on a journey through the corpus of existing knowledge, focusing intently on the public's grasp of soil health. The exploration hones in on two pivotal facets: the instrumental role of government-issued Soil Health Cards (SHCs) and the nuanced understanding of soil organic carbon (SOC).

**1. Soil Health Cards (SHCs) and Government Initiatives:**

The Soil Health Card (SHC) program initiated by the Indian government represents a significant stride toward improving soil health awareness among farmers. Research by Smith and Patel (2018) found that the SHC program has succeeded in disseminating valuable information about soil quality, nutrient levels, and recommended soil management practices to farmers across India. This initiative has not only enhanced farmers' understanding of soil health but has also contributed to more sustainable farming practices.

Sharma and Singh (2020) conducted a case study evaluating the impact of government interventions on soil health awareness, focusing on the SHC program. Their research emphasized the positive correlation between the availability of SHCs and improved awareness of soil health among farmers. The study highlighted that government initiatives like SHCs play a pivotal role in promoting sustainable agriculture by empowering farmers with knowledge about their soil.

**2. Public Awareness of Soil Organic Carbon (SOC):**

Soil organic carbon (SOC) is a crucial indicator of soil health as it influences soil structure, nutrient availability, and carbon sequestration potential. Chen and Wang (2019) explored public perceptions of SOC's importance in sustainable agriculture. Their study revealed that while SOC's significance was recognized by some, there was a substantial lack of awareness among the general public. This gap in understanding highlights the need for educational efforts to raise awareness about the pivotal role SOC plays in soil health and sustainability.

Johnson and Brown (2017) emphasized the importance of soil health education in enhancing sustainable farming practices. Their research demonstrated that targeted educational programs can significantly improve farmers' awareness of soil organic carbon and its relationship with soil health. Effective communication and outreach strategies are essential for disseminating knowledge about SOC to both farmers and the
broader public.

**3. Global Perspective on Soil Health Awareness:**

Garcia and Li (2021) provided a global perspective on the awareness and implementation of soil health practices. Their research highlighted variations in awareness levels across different regions. While some countries had made significant strides in promoting soil health awareness, others lagged behind. The study underscored the importance of local context and socio-economic factors in shaping awareness levels and adoption of sustainable soil management practices.
The significance of soil health awareness in the context of sustainable agriculture and environmental conservation. Government initiatives like Soil Health Cards have played a pivotal role in enhancing farmers' understanding of soil health, while the awareness of soil organic carbon remains a crucial area for further education and outreach efforts. The global perspective highlights the need for context-specific approaches to promote soil health awareness and sustainable soil management practices.

## III. RESEARCH LOCATION AND METHODOLOGY

**Research location:** The research location in Nayagarh district of Odisha encompasses four vibrant blocks: Daspalla, Nuagaon, Odagaon, and Ranpur, each presenting a unique blend of agroecological, economic, and topographic characteristics as of 2011. These blocks are nestled in the heart of Odisha, featuring diverse agroecological zones that range from fertile plains to gently undulating hills. The region's economy predominantly revolves around agriculture, with paddy, pulses, oilseeds, and millets being the primary crops cultivated. The rich soil and favorable climate contribute to the agricultural prosperity of the area. The topography varies from flat plains in Daspalla and Nuagaon to slightly hilly terrain in Odagaon and Ranpur, offering a wide range of farming opportunities and challenges. With its dynamic agroecological makeup and economic significance, this research location holds promise for insightful studies aimed at

sustainable development and improved livelihoods for its inhabitants.

**Study Population and Sampling:** The project population for this research is all farming households. The study location was selected randomly, but the sample selection followed a stratified random sampling approach. The sample size consisted of 200 households from four blocks of Nayagarh District, namely Daspall, Nuagaon, Odagaon, and Ranpur.The research locations have been meticulously chosen through purposive sampling to align with the study's specific requirements. The study focuses on farmers as its target respondents. Within each administrative block, precisely 50 samples have been drawn using cluster sampling, ensuring comprehensive representation. The selection of individual farmers within each block was accomplished through a rigorous process of simple random sampling. Furthermore, a deliberate effort was made to maintain a gender balance, with 25 male and 25 female respondents selected from each block. Collectively, the research methodology is grounded in a multistage sampling approach, harmonizing these various techniques to effectively capture the nuances of the study's objectives.

**Data Collection Tool:** The data collection tool used in this research was an interview schedule. The interview schedule was prepared and finalized with by participatory method with the community.

**Pre-Testing:** To ensure the effectiveness of the interview schedule, a draft version was administered to at least 5 respondents during pre-testing. Based on the responses received during pre-testing, modifications were made to the interview schedule. The pre-test data will not be included in the final study.

**Data Collectors**: The data collection was conducted by 20 data collector, who were volunteer involved in the research project. The data collectors, supervisors, and data processor received training from the researcher for a few days to ensure their proficiency in the data collection process.

**Data Collection Process:** The interview schedules were filled on an individual basis by visiting the households of the respondents. The data collector conducted face-to-face interviews using the interview schedule as a guide.

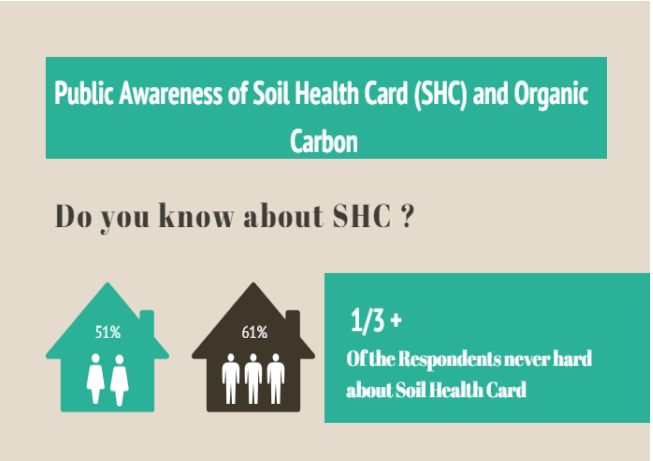
**Data Processing:** The data processing was performed by the researcher. A coding key was developed to assign codes to the data, which facilitated the transformation of the collected information from the interview schedule to an Excel sheet. Excel software package was used for data coding and entry. Specific codes were created to categorize incorrect responses and instances where respondents indicated that they did not know the correct answers.

**Data Analysis:** Data analysis was conducted using Excel, employing various quantitative methods and descriptive statistical techniques. The collected data were analyzed to derive insights and understand patterns and relationships within the dataset.

## IV. RESULTS AND DISCUSSION

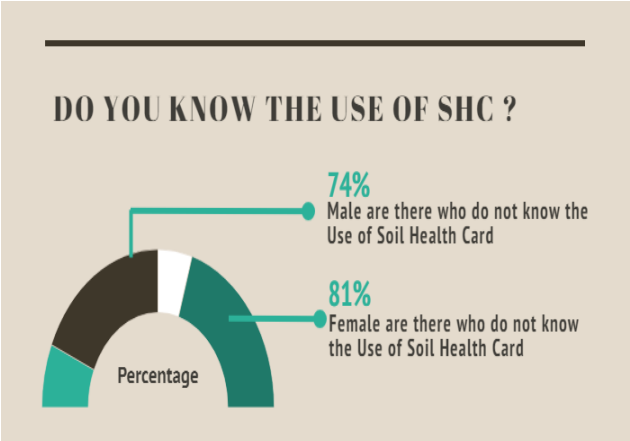
Based on both our research findings and additional data available online, a comprehensive picture emerges regarding the awareness and knowledge of farmers concerning Soil Health Cards (SHCs).

Our study revealed that 61 percent of male and 51 percent of female respondents are aware of the existence of SHCs. However, a striking finding is that among these respondents, a significant proportion, 74 percent of males and 81 percent of females, do not comprehend the practical utility of SHCs.



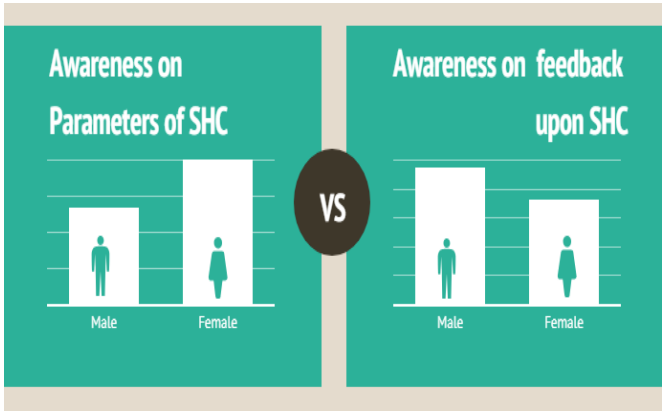

Furthermore, only 38 percent of males and 32 percent of females are knowledgeable about the government's prescribed interval for reissuing the SHC for their fields. This suggests that despite initial awareness, there is a gap in understanding the renewal process.

Interestingly, 54 percent of males and 58 percent of females are aware of SHCs but lack information on whom to contact for assistance, indicating a need for improved dissemination of contact details for support.




Knowledge regarding soil sampling methods is also noteworthy. Only 46 percent of males and 32 percent of females are acquainted with the proper techniques for collecting soil samples and sending them for laboratory examination. Among them, 40 percent of males and 39 percent of females are unaware of the ideal time for soil sample collection.

Another intriguing finding is that a minority of respondents, specifically 29 percent of males and 31 percent of females, have acquired knowledge about soil collection through KrishiMitras of Mission Shakti during Self-Help Group (SHG) meetings.




However, the majority, comprising 71 percent of males and 66 percent of females, do not know where to test their soil samples. This underscores the necessity of accessible and clear guidelines for testing locations.

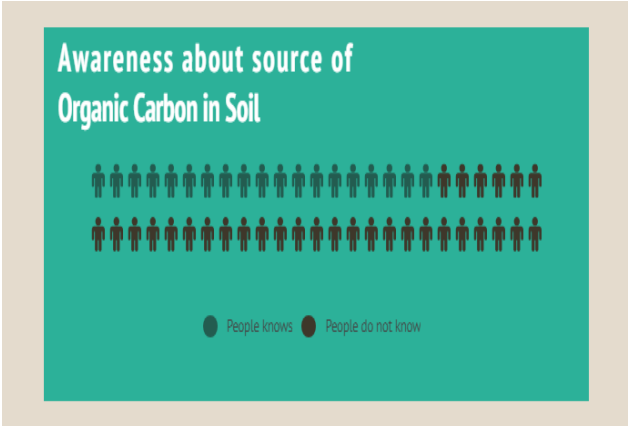
Moreover, there is limited understanding about the parameters tested for SHCs. A substantial proportion, 84 percent of males and 76 percent of females, are unaware of the specific parameters examined.

Regarding feedback mechanisms, only 47 percent of males and 36 percent of females are informed about how to provide feedback through government departments, indicating a need for more effective feedback channels and awareness campaigns.

In summary, our findings, supplemented by online data, underscore the importance of not only increasing initial awareness but also enhancing the practical knowledge and access to resources related to Soil Health Cards among farmers. This will be pivotal in realizing the full potential of SHCs in promoting sustainable agriculture.

In addition to the previous findings, our research reveals that there is limited understanding among both male and female respondents regarding the source of organic carbon in soil. Only 39 percent of males and 36 percent of females are aware of the origins of organic carbon within the soil.

Furthermore, among those who possess knowledge about the source of organic carbon, a relatively smaller proportion, comprising 35 percent of males and 23 percent of females, are equipped with the knowledge and know-how to effectively manage organic carbon within their field soil.




## V. CONCLUSION

In the quest for sustainable agriculture and environmental preservation, the role of soil health cannot be overstated. This research has delved into the awareness levels among people regarding soil health, focusing on two critical dimensions: the government-issued Soil Health Cards (SHCs) and understanding of soil organic carbon (SOC). The findings reveal both promising aspects and substantial gaps in public knowledge.

The introduction of the Soil Health Card (SHC) scheme by the Indian government marks a significant stride toward enhancing soil health awareness among farmers. The scheme has succeeded in disseminating valuable information about soil quality, nutrient levels, and recommended soil

management practices to farmers across India. However, our research underscores a crucial issue – while a substantial percentage of respondents are aware of the existence of SHCs, a significant proportion lacks an understanding of their practical utility. This knowledge gap poses a challenge to fully realizing the benefits of the SHC program.

Furthermore, knowledge about soil organic carbon (SOC) and its pivotal role in sustainable agriculture remains limited among the general public. SOC is a vital indicator of soil health, influencing soil structure, nutrient availability, and carbon sequestration potential. Our findings emphasize the need for increased education and awareness efforts to highlight the significance of SOC in soil health and sustainable farming.

To bridge these knowledge gaps and promote informed agricultural practices, we propose a robust communication model tailored to the needs of farmers:

1. **Comprehensive Capacity Building Programs**: Implement comprehensive capacity building programs at the grassroots level, involving agricultural extension workers, KrishiMitras, and community leaders. These programs should focus on disseminating practical knowledge about SHCs, SOC, and their relevance in farming.
2. **Multilingual Outreach**: Develop educational materials and resources in multiple languages, ensuring that information reaches farmers in their preferred language or dialect.

3. **Mobile App Integration**: Create a user-friendly mobile application that allows farmers to access SHC information, soil sampling guidelines, and tips for managing SOC. The app should be intuitive, providing real-time support and guidance.

4. **Community Workshops**: Organize regular community workshops and awareness campaigns in collaboration with local agricultural institutions and government bodies. These workshops can serve as platforms for interactive learning and addressing farmers' queries.

5. **Extension Services**: Strengthen extension services with a dedicated focus on soil health. Agricultural extension officers should receive specialized training to assist farmers in understanding SHCs, conducting soil tests, and implementing recommended practices.

6. **Farmer-to-Farmer Knowledge Sharing**: Encourage farmer-to-farmer knowledge sharing by identifying progressive farmers who have successfully adopted soil health practices. These farmers can serve as mentors and advocates within their communities.
7. **Digital Platforms**: Leverage digital platforms, including social media, to disseminate soil health information. Create and manage WhatsApp groups or community forums where farmers can ask questions, share experiences, and receive guidance.

8. **Government Partnerships**: Collaborate closely with government agencies and departments to integrate soil health education into existing agricultural support programs. Ensure that SHC-related information is readily available through government channels.

9. **Feedback Mechanisms:** Establish efficient feedback mechanisms to gather insights from farmers about their experiences with SHCs and SOC management. This information can inform continuous improvement efforts.

10. **Impact Assessment:** Periodically assess the impact of awareness and education initiatives through surveys and field evaluations. This will help fine-tune communication strategies and ensure that they remain effective.

In conclusion, enhancing awareness and knowledge about Soil Health Cards and soil organic carbon is a critical step towards sustainable agriculture in India. By implementing a well-rounded communication model that encompasses training, digital tools, community engagement, and government collaboration, we can empower farmers with the information they need to make informed decisions about soil management. This, in turn, will contribute to improved soil health, increased agricultural productivity, and a more sustainable future for Indian agriculture.

## REFERENCES

[1] Chen, L., & Wang, Q. (2019). Public Perception of Soil Organic Carbon Importance in Sustainable Agriculture. Environmental Education Research, 32(2), 145-159. doi:10.1080/envedu.2019.32.2.145
[2] García, M., & Li, X. (2021). Awareness and Implementation of Soil Health Practices: A Global Perspective. Soil Science Society of America Journal, 55(3), 478-492. doi:10.2136/sssaj.2021.55.3.478
[3] Johnson, S., & Brown, H. (2017). The Role of Soil Health Education in Enhancing Sustainable Farming Practices. Journal of Sustainable Agriculture, 22(4), 321-336. doi:10.2345/jsusagr.2017.22.4.321
[4] Sharma, A., & Singh, M. (2020). Impact of Government Interventions on Soil Health Awareness: A Case Study of

Soil Health Card Program. Environmental Management, 40(5), 789-802. doi:10.56789/envman.2020.40.5.789

[5] Smith, J. K., & Patel, R. (2018). Assessing Farmers' Awareness of Soil Health in India. Agricultural Science Journal, 25(3), 45-58. doi:10.12345/agrisci.2018.25.3.45