Soil health cards: limitations and ways to fix the loopholes

Ankita Trivedi and Asik Dutta

The Government of India had initiated the Soil Health Card (SHC) Scheme in February 2015 to promote balanced fertilization to protect soil health and for sustainable agriculture. SHC is a field-specific detailed report of soil fertility status and other important soil parameters that affect crop productivity. It is similar to a physician's prescription, where the health status of the soil is provided and recommendations are made to the farmers accordingly. Details in a SHC includes 12 important parameters such as pH, electrical conductivity (EC), organic carbon, macro-nutrients like N, P and K, secondary nutrients like sulphur and micronutrients such as zinc, iron, manganese, copper and boron[1].

Benefits of using SHCs

Proper implementation of the SHC Scheme and following the recommended practices accordingly has the potential to revolutionize Indian agriculture and the associated economy. Among numerous benefits of the SHC Scheme, the four major ones are listed below:

(1) *It reduces the cost of crop cultivation:* Site- and crop-specific recommendations cutdown the cost of excessive unwanted fertilizer use.
(2) *It increases farm income:* Balanced judicious management of nutrients will reduce the cost and result in greater net gain.
(3) *Increased crop productivity is achieved:* When the soil stays in good health enriched with optimum nutrients required for crop growth, boosted productivity is ensured.
(4) *Improvement in soil health is ensured:* Proper management helps in bridging the nutrients gap, thereby ensuring good soil health.

Limitations in the successful implementation of the SHC Scheme

Even in the best of plans/programmes, certain loopholes do exist. The SHC Scheme runs on a large scale, but this will not be sufficient if precision, honesty and devotion are lacking. The problems encountered are the following. (i) First and foremost, if the farmers are unaware of the importance of SHCs, then it is just like a piece of paper generating garbage. Awareness should be created among them about the importance of site-specific nutrients management. As compelling farmers to forceful adoption is not an alternative, they have to be made aware of the consequences of soil mismanagement and see prominent evidences. They should be informed about the ill effects of excessive fertilization, gradual decrease in soil fertility status, and deteriorating soil health which ultimately hampers agricultural production resulting in barren soil. (ii) Soil sampling is the most important step in soil testing. If the soil is not sampled properly, then the test report generated using this sample will not represent the nutrient status of the whole field. The entire recommendations will change accordingly, resulting in erroneous management practices. So, training at the farmers' level is necessary to make the Scheme successful. (iii) In the Indian scenario, the demand is high whereas resources are limited which causes delay and non-uniformity in report generation. Meagre infrastructure, and scarcity of resources and manpower at times are a hindrance in achieving the goals in the limited time period. (iv) Lack of specified guidelines brings non-uniformity in the results, leading to improper data compilation at a larger scale. (v) Once the report is generated, distribution is another herculean task. After reaching the farmers, personal verification shows that most of the time it gets treasured with them without knowing its meaning, following the recommendation is yet another story. (vi) Lack of an organized regulatory and monitoring body brings a certain degree of anomaly in the Scheme in terms of successful implementation. Monitoring at each step of SHC generation will help maintain precision, authentication and validation in the report. Unless these loopholes are fixed on time, this Scheme will not be successful. Massive efforts are needed for the smooth running of the SHC Scheme to get the desired benefits.

Improvizing the SHC Scheme

The SHC Scheme is an ambitious project for sustaining soil health and getting worthwhile returns, but there is always scope for improvement in every aspect of it. To reduce cost, maintain precision and improve quality, the Scheme can further be improvized in terms of frequency of soil testing, incorporating the most important parameters in it, reduction in the number of sampling sites, recommendations based on climate suitability and locally available resources, development of mini kits for on-farm assessment of soil health status and community approach in soil testing. So, for improving the SHC Scheme, the following points need to be taken care of:

- *Change in sampling procedure:* Most of the farmers have an issue that the soil is not from their fields. So, apart from grid sampling, point sampling procedure should be followed to minimize the inter-field heterogeneity leading to farmer-specific recommendations.
- *Soil variogram:* Development of soil variograms can reduce money and manpower, and increase the relevance of recommendations to farmers.
- *Making the Scheme more farmer-friendly:* According to farmers, the SHC Scheme is too scientific. For example, terms like 'pH' or 'EC' are cryptic to many of them. So, a modified Scheme describing these parameters in local language will be easier to grasp.
- *On-field demonstrations:* Uniform and accurate practices must be followed in soil sample collection.
- *Time span:* SHCs are issued for a period of three years. Revision in two years interval may be more scientific.
- *Test results of groundwater or irrigated water:* In association with soil parameters, water quality parameters like EC, total dissolved salts, content of nitrate (NO_3^-), presence of toxic/heavy metals (As, Se, Pb), etc. should be included.
- *Infrastructure and facility development:* Nowadays many handy instruments available in the market can

analyse the soil and generate satisfactory results. For instance, ICAR-Indian Agricultural Research Institute, New Delhi has developed the pusa STFR (soil test fertilizer recommendation) metre, which is a simple and portable kit[2,3]. This kit helps the farmers in testing 12 important soil parameters and also recommends fertilizer dose for 100 crops within a short time and at a Village Community Centre nearby, thus helping them achieve higher yields, increase their income and keep the soil fertile. It also prints SHCs and can send soil test reports to farmers via SMS. So, maintaining such kits in Village Community Centres can help in the periodical analysis of soil.

- *Report preparation:* A well-structured authority is needed to monitor the whole process of report generation before distribution.
- *Extension activities:* Awareness to be generated on the importance and implementation of SHC Scheme-generated recommendations.
- *Feedback:* The success stories of farmers who have benefitted from the Scheme should be communicated with the others to motivate them to follow the recommendations to obtain the desired output.

Conclusion

To restore and maintain soil health, SHCs will prove to be one of the most important tools not only for guiding stakeholders towards sustainable agriculture, but also indirectly benefitting the flora and fauna to flourish naturally in healthy soils. Striving for balance and sustainability requires long-term dedicated efforts. So periodic improvization will be needed depending upon the feedback received. The SHC Scheme should now gear up for proper mainstreaming of resources, funds and efforts.

1. https://soilhealth.dac.gov.in/
2. http://iari.res.in/files/Divisions/SSAC/Pusa_STFR_Meter-27102016.pdf
3. https://icar.org.in/files/NRM-2702.pdf

Ankita Trivedi is in the ICAR-Central Arid Zone Research Institute, Regional Research Station, Jaisalmer 345 001, India; Asik Dutta is in the ICAR-Indian Institute of Pulses Research, Kanpur 208 024, India.*
**e-mail: ankita_trivedi@outlook.com*