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Soil health card relationship with the fertilizer consumption in Telangana

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Abstract
The study has been conducted with the objective to analyse the SHC relation with the fertilizer consumption in Telangana. Secondary data related to total number of Soil Health Cards distributed and fertilizer consumption in all districts of Telangana is collected from the implementation of Soil Health Card scheme from 2015 -2021.Correlation is done between SHC distributed and fertilizer consumption for three periods cycle-1(2015-17), cycle-2 (2017-19), Demonstration programme (2019-21). During the study period it was observed that negative relation was observed.

Keywords: SHC, fertilizer consumption, correlation, Telangana, demonstration programme

Introduction
Soils provide the resources that support and sustain a large diversity of living forms on earth. These dynamic resources condition is determined by a complex web of physical, chemical, and biological interactions that promote strong plant development. Unhealthy soils that lack the nutrients necessary for crop growth require more input, use input inefficiently, provide less output per unit of input, and with time, their productivity potential weakens. In 2002, the International Union of Soil Sciences (IUSS), seeing the value of soils, suggested holding an annual international day for soils to raise awareness of the need for healthy soils and sustainable management of soil resources.

At the same time, it has been noted that many areas of India exhibit deficiencies in secondary (Sulphur, Calcium, and Magnesium) and micronutrients (Boron, Zinc, Copper, and Iron) in addition to primary nutrients (N, P, and K). By launching a national initiative to practise healthy agriculture by preserving the soil resources through the Soil Health Management component under National Mission for Sustainable Agriculture (NMSA) in 2014, the Government of India took steps to improve the situation and encourage the farmers for balanced use of fertilisers. Integrated Nutrient Management (INM) Division of Department of Agriculture and Cooperation, Ministry of Agriculture and Farmers Welfare, Government of India, is the organisation responsible for carrying out the SHM programme.

A Soil Health Card (SHC) is a printed card provided to a farmer that provides information about the status of various plant nutrients present in his or her soil (soil health indicators) as well as the recommended dosage of various fertilisers for the main crops cultivated in that farmer's property based on the findings of soil tests. In addition to the farmer's personal information, such as their Aadhaar number and plot information, the soil health card currently shows the status of 12 important parameters, including pH, EC, Organic carbon, available Nitrogen (N), Phosphorus (P), Potassium (K), Sulphur (S), Iron (Fe), Manganese (Mn), Zinc (Zn), Copper (Cu), and Boron (B). The implementation of soil health card-based fertiliser recommendations is predicted to reduce fertiliser use as a result of the benefits of the soil health card programme.

Objective of the study
To analyse the SHC relation with the fertilizer consumption in Telangana.

Data base and Research Methodology

The study was based on the secondary data collected from the Directorate and commensurate of Agriculture office, Telangana. Data related total number of soil health cards distributed and fertilizer consumption for the period 2015-21. Respective secondary data was collected for all districts of Telangana state. The relation was studied according to cycles and demonstration programme implemented by Soil Health Card scheme.

Cycle-1 - 2015 to 2017

Cycle 2 - 2017 to 2019
Demonstration programme- 2019-21
Correlation analysis was done for above mentioned cycles and programme between SHC and fertilizer consumption. The correlation coefficient measures the strength and direction of the linear relationship between two variables - in this case, the distribution of Soil Health Cards and fertilizer consumption. The correlation coefficient value ranges from -1 to +1.

Results and Discussion

S.NO	Soil health card scheme	Total SHC distributed in all districts of Telangana	Total fertilizer consumption in all districts of Telangana (In MTs)	Correlation coefficient (r)
1	Cycle-1 (2015-2017)	55,53,982	55,03,245.85	-0.887081771
2	Cycle -2 (2017-19)	48,42,509	60,65,615.041	-0.132473078
3	Demonstration programme (2019-21)	48,42,509	76,38,404.506	-0.50911454

Cycle-1 (2015-2017)

The correlation coefficient value of -0.887 suggests a strong negative correlation between the distribution of Soil Health Cards and fertilizer consumption. This means that as the number of SHCs distributed increased during this cycle, fertilizer consumption decreased significantly.

Cycle -2 (2017-19)

The correlation coefficient value of -0.132 indicates a weak negative correlation between SHCs distributed and fertilizer consumption during this cycle. The negative correlation suggests that there might is a slight decrease in fertilizer consumption with an increase in SHC distribution, but the relationship is not very strong. The low distribution of Soil Health Cards (SHCs) during Cycle 2 (2017-19) could be attributed to various factors. Here are some possible reasons like lack of Awareness, Implementation Challenges, Funding Constraints, Administrative and Political Factors, Farmer's Perception and Acceptance, Technical and Infrastructural Challenges Communication and Outreach, Evaluation and Feedback from Cycle 1.

Demonstration programme (2019-21)

The correlation coefficient value of -0.509 shows a moderate negative correlation between the distribution of SHCs and fertilizer consumption during the demonstration program. This suggests that there was a noticeable reduction in fertilizer consumption as the number of SHCs distributed increased, but the relationship is not as strong as in Cycle-1.

Overall, the data indicates that there is a negative correlation between the distribution of Soil Health Cards and fertilizer consumption in Telangana. This suggests that the implementation of the SHC scheme have contributed to a decrease in fertilizer usage over time. However, it's important to consider other factors also might influence fertilizer consumption, such as changes in agricultural practices, awareness about sustainable farming, availability of alternative soil nutrient management techniques, etc.

To address the low distribution of SHCs, it would be essential for authorities to identify the specific reasons behind the low numbers and take appropriate corrective measures. These could include improved awareness campaigns, resolving administrative and infrastructural issues, increased funding, and better coordination among different stakeholders involved in the implementation of the scheme. Feedback from farmers and constant monitoring of the distribution process can also help in overcoming the challenges and ensuring better results in future cycles.

Conclusion

In conclusion, the correlation analysis between SHCs and fertilizer consumption is a valuable tool for guiding agricultural policies, promoting sustainable farming practices, and improving soil health. By leveraging this analysis, stakeholders can work together to create a more environmentally friendly and economically sustainable agricultural sector. Negative correlation between SHCs and fertilizer consumption is observed, it indicate that the SHC scheme is positively influencing farmers to adopt better soil nutrient management practices.

Future scope

The correlation analysis between Soil Health Cards (SHCs) and fertilizer consumption can provide valuable insights for policymakers they can use this information to enhance the implementation of the SHC scheme or consider similar approaches in other regions. Farmers who possess SHCs tend to consume fewer fertilizers, targeted awareness campaigns can be designed to educate farmers about the benefits of soil testing and the use of SHCs. Increased awareness can encourage more farmers to adopt sustainable agricultural practices, leading to reduced fertilizer usage and improved soil health. Also help the concerned authorities in Resource Allocation Long-term Impact Assessment, Environmental Impact Analysis, Identifying Other Influencing Factors, Integration with Precision Agriculture and farmer Training Programs.

Conflict of Interest

None

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