



Study on Soil Health Awareness among Farmers: A Comprehensive Field Study and NSS Intervention Report from Rajnandgaon District, Chhattisgarh

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Soil health is central to sustainable crop production, nutrient-use efficiency and long-term farm productivity. This NSS field-oriented study examines awareness, community participation and reported adoption of soil-health practices among 120 farming households across Kopedi, Barga and Torankatta villages of Rajnandgaon district, Chhattisgarh. The intervention framework combines baseline survey, Participatory Rural Appraisal, door-to-door awareness, rallies, soil-sampling assistance, and demonstrations on composting and balanced nutrient management, youth activities and follow-up visits. The illustrative draft dataset indicates general soil-health awareness of 53.3% and awareness of NSS-led soil-health initiatives of 84.2%. Participation was highest in awareness rallies (88.3%) and soil-testing/sample-collection activities (76.7%). Reported adoption was highest for farmyard manure/compost use (80.0%), followed by recommended fertilizer use (75.8%) and soil testing (73.3%). The findings framework suggests that NSS volunteers can help translate technical soil-management recommendations into practical village-level action, while continued technical handholding is required for Soil Health Card interpretation, micronutrient management and residue recycling. The numerical values are presented as an illustrative draft and should be validated against primary field records before academic submission.

Keywords: Soil Health, Soil Testing, Soil Health Card, Integrated Nutrient Management, NSS, Farmer Awareness.

Introduction and Background

Context and problem statement: Soil is the foundation of agricultural production, food security and rural livelihoods. Soil health refers to the continued capacity of soil to function as a living system that sustains plant productivity, regulates water and nutrient cycling and supports biological activity. In many farming systems, repeated cultivation, imbalanced fertilizer use, declining organic matter, erosion, residue burning and inadequate recycling of farm wastes can reduce soil quality. Farmers may recognize declining crop response or increasing fertilizer requirements without having access to simple, locally relevant information about soil testing and nutrient management.

Regional significance and policy framework: Chhattisgarh, widely recognized for its importance in rice-based agriculture, contains diverse production systems ranging from paddy and wheat/chickpea to vegetables and fruit crops. Soil fertility management is therefore important for maintaining productivity while avoiding unnecessary input use. National initiatives such as the Soil Health Card Scheme, Soil Health Management, Paramparagat Krishi Vikas Yojana (PKVY), watershed programmes and extension services provide a policy framework for soil testing, balanced nutrient use, organic matter management and sustainable agriculture.

Role of Youth Mobilization through NSS: Sustainable soil management depends not only on availability of recommendations but also on farmers' understanding, confidence and willingness to apply them. The National Service Scheme (NSS), launched in 1969 under the Ministry of Youth Affairs and Sports and guided by the motto 'NOT ME BUT YOU', provides a platform through which student volunteers can connect educational institutions with rural communities. Through household visits, awareness meetings, demonstrations, soil-sampling assistance and Shramdaan, NSS volunteers can support farmers in understanding soil testing, Soil Health Cards, organic matter recycling and balanced nutrient management. This study presents a field-oriented assessment of soil health awareness and the role of NSS interventions in selected villages of Rajnandgaon district.

Table 1: State and National Policy Alignment

Scheme / Programme	Core Objective	Major Field Activities	Relevance to Soil Health	Significance
2015	Provide farmers with soil-test based nutrient recommendations	Soil sampling, testing, Soil Health Cards, nutrient advisories	Promotes balanced and need-based fertilization	Improves nutrient-use efficiency and farmer decision-making
2014-15	Improve soil fertility through integrated nutrient management	Organic matter management, soil amendments, demonstrations	Supports balanced use of organic and inorganic nutrient sources	Maintains soil productivity and reduces nutrient imbalance
2015	Promote cluster-based organic farming	Organic inputs, farmer training, certification support	Encourages recycling of biomass and reduced dependence on synthetic inputs	Supports soil biological activity and sustainable farming
2006	Create durable rural natural-resource assets	Water harvesting, land development, plantation, soil-moisture works	Reduces erosion and improves moisture conservation	Supports productive and resilient rural landscapes
2021	Treat degraded land and manage runoff	Contour measures, gully plugs, afforestation, runoff control	Controls soil erosion and improves soil moisture	Protects topsoil and supports groundwater recharge

Study area, Research methodology and intervention strategy

Study Location Profile: The research and field interventions were conducted in Rajnandgaon district, (C.G.) situated in the central plains region. Three representative agricultural villages—Kopedih, Barga and Torankatta—were selected. Kopedih and Barga are officially adopted villages under the college NSS unit. The same rural setting used in the reference field study was retained so that the proposed soil-health investigation remains consistent with the original NSS field context.

Socio-Agricultural profile of selected village (Kopedih)

Table 2: Baseline profile of Kopedih village

Village	Kopedih
Tehsil	Dongargaon
District	Rajnandgaon
Main market	Rajnandgaon
Krishi Upaj Mandi	Rajnandgaon
Location	07 km from college of horticulture

Village	Kopedih
Total population	1321 (Male-684, Female-637)
Total no. of farmers	357
Total geographical area	257.47 ha
Total cropped area	162 ha
Forest area	Nil
Cropping pattern	Vegetable – Tomato, Brinjal, Chilli, Cauliflower, Cabbage, Knol Khol, Pointed Gourd; Fruit Crop – Musk Melon; Ornamental Crop – Marigold; Field Crop – Rice, Wheat/Chickpea

Sampling and research design: A total sample of N = 120 adult respondents engaged in farming or household agricultural decision-making was considered across Kopedih, Barga and Torankatta. The study follows a participatory action-research framework combining Participatory Rural Appraisal (PRA) tools—resource mapping, social mapping and problem identification—with structured pre- and post-intervention surveys. For an academic submission, the numerical findings in the results tables should be checked against the actual NSS field survey records before final submission.

Intervention Framework: The NSS extension programme was executed through structured phases:

- (1) Baseline Survey & PRA mapping to document farmers' existing knowledge of soil fertility, soil testing, organic matter management and major soil-health constraints.
- (2) Multi-channel awareness campaigns featuring door-to-door visits, farmer meetings, rally processions with placards, instructional leaflets, poster exhibitions and Nukkad Natak (street plays) focused on soil testing, balanced fertilization and conservation practices.
- (3) School- and youth-based interventions including essay, slogan, quiz and drawing competitions to develop young “soil ambassadors” who could communicate simple soil-health messages within their families.
- (4) Physical and demonstration action (Shramdaan) involving compost-pit preparation, farm-waste management, demonstration of soil-sampling procedures and plantation/cover-crop activities that reinforce soil organic matter and erosion control.
- (5) Follow-up Evaluation Visits to measure changes in awareness, participation and reported adoption of soil-health practices.

Results and Discussion

Findings: The survey data were organized using descriptive statistics to examine respondent characteristics, baseline awareness, participation in NSS activities, reported adoption of soil-health practices and perceived impact of the intervention. The figures below are structured as an illustrative draft dataset for the proposed NSS research paper and should be replaced or validated with the actual field observations before academic submission.

Sample Demographics and Baseline Awareness

The sample comprised 120 respondents representing diverse socio-economic backgrounds, including male (58.3%) and female (41.7%) household heads, with respondents ranging from small and marginal farmers to larger agricultural landholders. Literacy levels ranged from limited formal schooling to postgraduate education.

Before the NSS intervention, awareness of soil-health concepts was uneven. Many farmers were familiar with fertilizer use and visible symptoms of nutrient deficiency, while fewer respondents reported routine soil testing, interpretation of Soil Health Cards or systematic use of organic matter and micronutrients based on soil-test recommendations.

Table 3: General awareness and awareness specifically regarding NSS-led soil-health initiatives.

Awareness Category	Aware (Freq)	Aware (%)	Not Aware (Freq)	Not Aware (%)
General Soil Health Practices	64	53.3%	56	46.7%
NSS Soil Health Awareness Campaigns	101	84.2%	19	15.8%

Discussion: In the illustrative dataset, 53.3% of respondents reported general awareness of soil-health management, while 46.7% did not. Awareness of NSS-led soil-health activities was higher at 84.2%, suggesting that direct local outreach can improve recognition of soil testing, nutrient management and conservation messages. The difference between general awareness and campaign awareness also indicates the importance of repeated, practical extension activities rather than one-time information delivery.

Community Participation in NSS Extension Activities

The success of rural soil-health initiatives depends on active participation because farmers need opportunities to see, discuss and practice recommended techniques. Demonstrations and locally understandable messages can reduce the gap between awareness and field-level application.

Table 4: Details of farmer participation across five major NSS soil-health intervention categories

NSS activity category	Participated (Freq)	Participated (%)	Not Participated (Freq)	Not Participated (%)
Awareness Rallies & Processions	106	88.3%	14	11.7%
Soil Testing & Sample Collection	92	76.7%	28	23.3%
Compost / Vermicompost Demonstrations	86	71.7%	34	28.3%
Balanced Nutrient Management Demonstrations	78	65.0%	42	35.0%
Green Manure / Cover Crop Activities	69	57.5%	51	42.5%

Discussion: In the illustrative dataset, awareness rallies and processions recorded the highest participation (88.3%), followed by soil-testing and sample-collection activities (76.7%). Compost/vermicompost demonstrations attracted 71.7% participation. Participation in balanced nutrient-management demonstrations was 65.0%, while green-manure and cover-crop activities recorded 57.5%. The comparatively lower participation in field demonstrations may reflect labour demands and the timing of agricultural operations.

Farmer Adoption of Soil-Health Practices

Table 5: Details of reported adoption of soil-health practices after the intervention

Soil-health Practice	Adopted (Freq)	Adopted (%)	Not Adopted (Freq)	Not Adopted (%)
Soil Testing	88	73.3%	32	26.7%
Recommended Fertilizer Use	91	75.8%	29	24.2%
Farmyard Manure / Compost Use	96	80.0%	24	20.0%
Crop Residue Incorporation	70	58.3%	50	41.7%
Micronutrient Use Based on Soil Test	64	53.3%	56	46.7%

Discussion: In the illustrative dataset, farmyard manure/compost use recorded the highest reported adoption (80.0%), followed by recommended fertilizer use based on extension advice (75.8%) and soil testing (73.3%). Adoption of crop-residue incorporation was 58.3%, while micronutrient application based on soil-test recommendations was 53.3%. These differences indicate that practices requiring fewer specialized inputs may be easier for farmers to adopt, whereas test-based nutrient decisions may require continued technical support.

Perceived Overall Impact of NSS Interventions

Table 6: Overall perceived impact of the NSS soil-health awareness interventions

Perceived Impact Dimension	Affirmative (%)	Negative (Freq)	Negative (%)
105	87.5%	15	12.5%
Increased Soil-health Knowledge	86.7%	16	13.3%
Improved Awareness of Soil Testing	82.5%	21	17.5%

Field Challenges Encountered During Awareness Campaigns

Operational Constraints: Despite positive participation, student volunteers and organizers may encounter structural and socio-economic barriers during soil-health awareness activities:

- **Entrenched Fertilizer Habits:** Some farmers may prefer familiar fertilizer schedules and may be reluctant to change application practices without visible field evidence or repeated guidance.
- **Literacy and Technical Barriers:** Soil-test reports, nutrient units and Soil Health Cards can be difficult to interpret for farmers with limited formal education, requiring simplified visual communication and local-language explanations.
- **Labour and Time Conflicts:** Sampling, demonstrations and village meetings may compete with sowing, intercultural operations and harvesting schedules.
- **Cost and Input-Access Constraints:** Compost preparation, micronutrients, quality planting material and some soil amendments may require cash expenditure or reliable local supply.
- **Follow-up and Maintenance Gaps:** Awareness gains can decline if farmers do not receive timely soil-testing services, interpretation support and repeated field demonstrations after the initial campaign.

Strategic Recommendations and Policy Action Plan

Actionable Roadmap: Based on the field-oriented framework, the following measures are proposed to strengthen soil-health awareness and institutionalize youth-led extension activities:

1. Formalize permanent partnerships between University NSS cells, Krishi Vigyan Kendras (KVKs), soil-testing laboratories and Gram Panchayats for continuous, seasonal soil-health literacy campaigns.

- **Demonstration-Led Extension:** Establish low-cost soil-testing, composting, residue-management and balanced-fertilization demonstration units in village schools, farms and Panchayat bhawans.
- **Targeted Technical Handholding:** Provide practical assistance in soil sampling, Soil Health Card interpretation, fertilizer-dose calculation and selection of suitable organic and inorganic nutrient sources.
- **Youth and School Engagement:** Sustain essay, slogan, quiz and field-learning activities so that school and college students can act as recurring communication links between technical institutions and farming households.
- **Regular Soil-Health Follow-up:** Create village-level “Soil Health Groups” involving farmers, NSS volunteers and local extension workers to track soil-testing needs, composting activities and seasonal nutrient-management decisions.

Conclusion

The field-oriented NSS framework demonstrates how student volunteers can contribute to rural soil-health education by connecting technical recommendations with practical community activities. The illustrative assessment indicates substantial participation in awareness programmes and reported adoption of several low- to moderate-cost practices such as compost use, soil testing and recommended fertilizer management. At the same time, practices that require technical interpretation or sustained follow-up need continued extension support. Before formal publication or academic submission, all numerical results should be verified against primary survey records so that the paper reports observed rather than assumed field outcomes.

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