



ICAR-IISS

Newsletter



Volume 27, No.1 Jan-June 2024

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FORTHCOMING EVENTS

- 28th Research Advisory Committee Meeting of ICAR-IISS, Bhopal
- Hindi Pakhwada
- Vigilance Awareness Week
- World Soil Day Programme 2024

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Director's Desk

The Legacy and Future of Soil: From Ancient Wisdom to Sustainable Management

Soil has been a fundamental pillar of human civilization, shaping agriculture, culture, and livelihoods, particularly in India, where it has long been revered as a sacred and life-giving force. Ancient texts such as the Vedas and Rigveda highlight its importance, detailing different soil types and their agricultural significance. The Ramayana further emphasizes nature's ability to recycle organic matter, transforming waste into fertile soil that sustains life. Indian traditions and festivals, such as Pongal and Makar Sankranti, celebrate the fertility of the land, reinforcing the deep-rooted cultural connection between soil and survival. However, despite this historical reverence, the formal study of soil science in India began relatively recently, just over 150 years ago, with the appointment of an Agricultural Chemist. The establishment of the Imperial (now Indian) Agricultural Research Institute in 1905 marked the beginning of systematic soil research, followed by the expansion of agricultural education and research institutions. Over time, however, modern agricultural practices, particularly during the colonial era and the Green Revolution, led to significant soil degradation. The British focus on cash crops such as cotton, indigo, and tea resulted in monoculture, depleting soil fertility. Land revenue policies such as the Zamindari system further exacerbated soil exploitation, prioritizing short-term agricultural gains over sustainable land management. Post-independence, the Green Revolution introduced high-yielding crops, chemical fertilizers, and irrigation systems, drastically increasing food production from 82 million tonnes in 1960-61 to 308.7 million tonnes in 2020-21. However, excessive chemical usage and intensive farming led to severe soil degradation. With per capita land availability declining from 0.39 hectares in 1950 to just 0.10 hectares in 2021, and approximately 96.59 million hectares of land classified as degraded, India faces an urgent challenge in sustaining food security for its growing population, projected to reach 1.65 billion by 2060. Soil erosion alone results in the loss of nearly 3 billion tonnes of soil annually, further threatening agricultural productivity. Despite technological advancements, India's agricultural output remains lower than global standards, and concerns about food shortages loom large. To address this, maintaining soil health is imperative. Healthy soil provides essential nutrients, retains water efficiently, prevents erosion, and supports biodiversity, thereby ensuring agricultural sustainability. Integrating sustainable farming practices such as crop rotation, organic farming, conservation tillage, and regenerative agriculture can help restore soil fertility while reducing environmental damage. The Indian government has recognized the critical role of soil conservation, implementing initiatives such as the National Mission for Sustainable Agriculture, the Soil Health Card Scheme, and the Paramparagat Krishi Vikas Yojana. These programs aim to improve soil health, promote organic farming, and encourage scientific soil management practices. Moving forward, a balanced approach that combines traditional knowledge with modern scientific advancements is essential to combat soil degradation and sustain agricultural productivity. Farmers, policymakers, researchers, and communities must collaborate to implement sustainable soil management strategies. Investing in soil health through education, conservation, and policy interventions will be key to ensuring long-term food security and environmental resilience. The future of humanity depends on how we treat our soil today. As stewards of the land, we must commit to sustainable soil management, protecting this invaluable resource for generations to come.

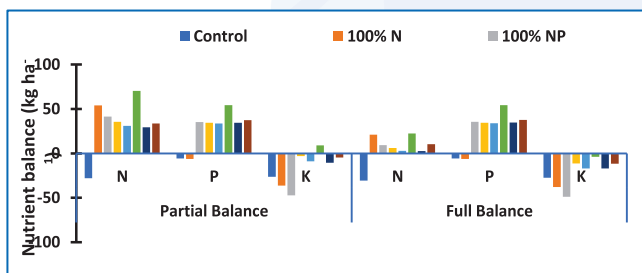




RESEARCH HIGHLIGHTS

Estimates on nutrient balance (N, P and K) through the NUTMON model as influenced by long-term fertilizer and manure application in rice-rice cropping system

The data on nitrogen (N), phosphorus (P), and potassium (K) balances revealed that N exhibited a positive balance in all treatments except the control, with values ranging from -28.10 to 70.21 kg ha⁻¹. The lowest balance was observed in the control (-28.10 kg ha⁻¹), while the highest was recorded with 150% NPK (70.21 kg ha⁻¹). For phosphorus, all treatments except the 100% N and the control reported a positive balance, ranging from -6.29 to 54.31 kg ha⁻¹. The lowest balance was found in the 100% N treatment, and the highest was again with the 150% NPK treatment. In potassium, all treatments exhibited a negative balance, except for the 150% NPK treatment, with values ranging from -47.28 to 9.03 kg ha⁻¹. The least negative balance was noted in the 150% NPK treatment, while the control recorded the highest negative balance. The comprehensive balance analysis using the NUTMON model highlighted a range from -30.70 to 22.32 kg ha⁻¹, with 150% NPK yielding the best results. The consistent negative K balance across all treatment's points to a risk of K depletion in long-term cropping. Therefore, the NPK recommendations for rice cultivation in Kerala may need to be revised accordingly.

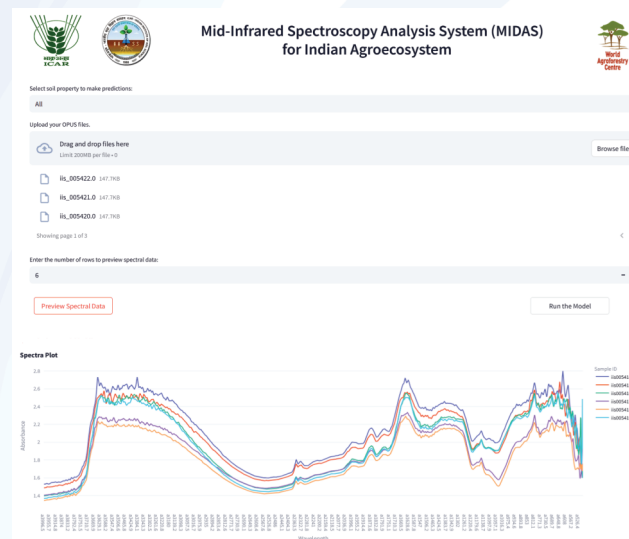


Estimates on nutrient balance as predicted by the NUTMON toolbox (Pattambi, Kerala)

Development of web-based mid-infrared spectroscopy analysis system (MIDAS) for Indian agroecosystem for rapid assessment of soil health parameters.

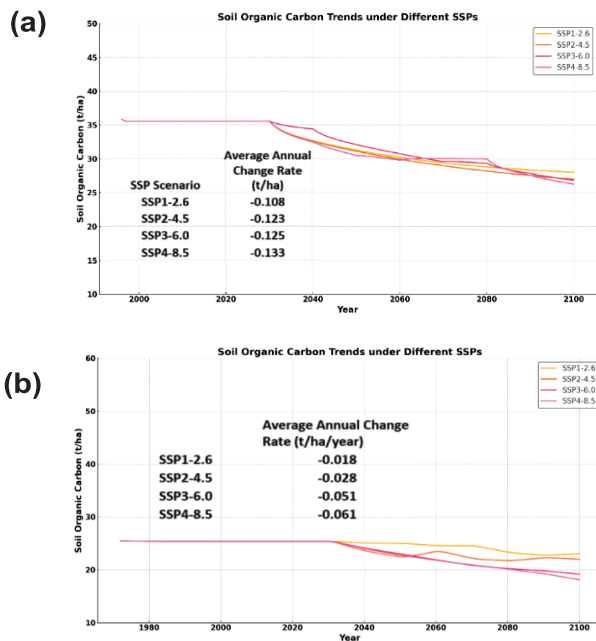
Mid-Infrared Spectroscopy (MIRS) is a rapid and cost-effective method for analyzing soil properties with minimal sample preparation. Despite its advantages, the adoption of MIRS is limited by the complexity of spectral data processing and the need for advanced computational

tools. The ICAR-IISS, Bhopal, has developed a web-based Mid-Infrared Spectroscopy Analysis System (MIDAS) to quickly extract soil information from soil spectra, facilitating large-scale monitoring that is crucial for precision agriculture and environmental sustainability. By utilizing machine learning algorithms, MIDAS enhances the accuracy and efficiency of soil property predictions, making them valuable for global soil assessment initiatives. Access it at <https://midas-system.streamlit.app/>.



Effect of Climate Change on Soil Organic Carbon (SOC) Dynamics

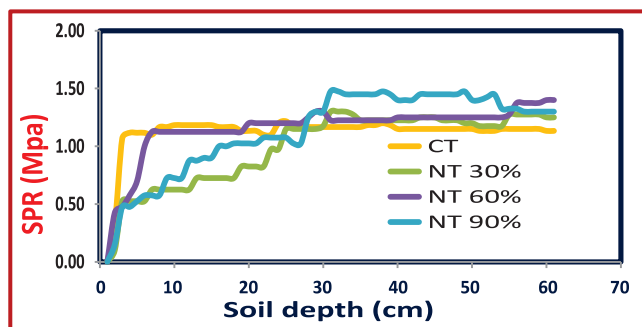
The SOC is vital for soil health and is sensitive to climate change, including changes in temperature and precipitation. The study revealed significant declines in Soil Organic Carbon (SOC) stocks across various agroecosystems in India under different Shared Socioeconomic Pathways (SSPs). Higher emission scenarios, particularly SSP4-8.5, lead to accelerated losses of soil organic carbon (SOC) due to increased mean annual temperatures (MAT) and altered rainfall patterns, which enhance decomposition and reduce carbon sequestration. Regions like Bengaluru and Udaipur face declines exceeding 0.1 t/ha/year. In contrast, moderate emissions (SSP1-2.6) result in lower SOC decline rates, highlighting the need for emission mitigation. The analysis also suggests that conservation agriculture and additional carbon inputs can help stabilize SOC levels, provided these strategies are aligned with climate change. These findings underscore the urgent need for climate-resilient strategies to manage soil carbon (SOC) and maintain soil health amid climate change.



Rate of average annual change rate (t/ha/yr) at LTFE centres
(a) Udaipur and (b) Bengaluru under different climatic scenarios.

Effect of eight years of no-tillage and residue retention on soil compaction

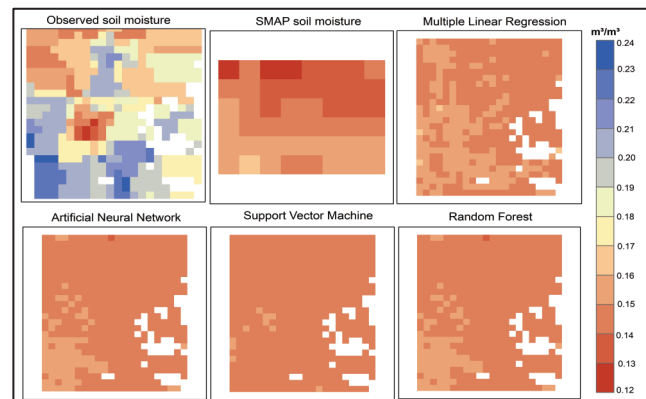
An eight-year study on conservation tillage in Vertisols at ICAR-IISS assessed soil compaction to a depth of 60 cm during the 2023 wheat season. Penetration resistance was measured at 60-70% field capacity moisture across four treatments, using a digital cone penetrometer at 90 days post-sowing. Treatments included conventional tillage (CT) and no-tillage (NT) with residue retention levels of 30%, 60%, and 90%. Penetration resistance varied from 0.48 to 1.13 MPa in the surface layer and 0.83 to 1.48 MPa in sub-surface layers. Higher resistance was observed in the surface (0-20 cm depth) under CT, but beyond 25 cm, NT treatments exhibited greater resistance. This indicates a potential risk of sub-surface compaction in no-tillage systems.



Penetration resistance under different tillage and residue level

Downscaling of satellite-derived surface soil moisture through machine learning

Using machine learning, the SMAP L4 surface soil moisture product was downscaled from 9 km to 1 km for Berasia tehsil, Bhopal. Dynamic data (NDVI, EVI, surface reflectance in red and NIR bands, and actual evapotranspiration) from MODIS and static soil properties from ISRIC-SoilGrids (1 km resolution) were upscaled to 9 km for model training (2016-2023). Different models, including ANN, MLR, SVM, and RF, were trained using ancillary data as predictors and SMAP L4 soil moisture as the target variable. Validation against in-situ observations from 50 sites showed surface soil moisture ranged from 0.12 to 0.24 m³/m³, while downscaled values varied from 0.12 to 0.17 m³/m³. RF performed best (RMSE: 0.09, R²: 0.25), while MLR had the lowest accuracy (RMSE: 0.13, R²: 0.08). Results indicate limitations in capturing observed soil moisture variability using coarse-resolution satellite data for downscaling.



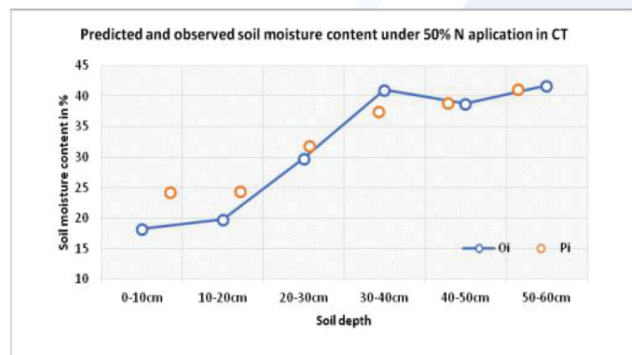
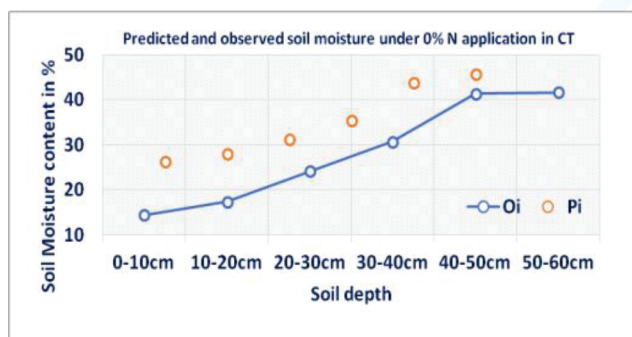
Validation of different machine learning models for downscaling surface soil moisture with the observed data

Simulating the effect of conventional versus no-tillage on soil water, heat dynamics and yield of wheat using the SWAP model

The SWAP model was validated using field data from TDR for soil water content and soil thermometers for soil temperature. Two tillage practices, CT and NT, were simulated. The agreement index (d) for grain yield, soil temperature, and soil water content ranged from 0.77 to 0.91. The average RMSE for soil water content was 2.3% in the upper soil layer and 11% in the 10-20 cm layer under NT. Mean relative errors (MRE) for grain yield and soil temperature were 10% and 8%, respectively. NT showed



10.1% lower annual water loss and 8.5% lower soil temperature in the top 10 cm compared to CT. These findings highlight the effectiveness of the SWAP model in simulating field water cycles and temperature dynamics under various tillage systems.



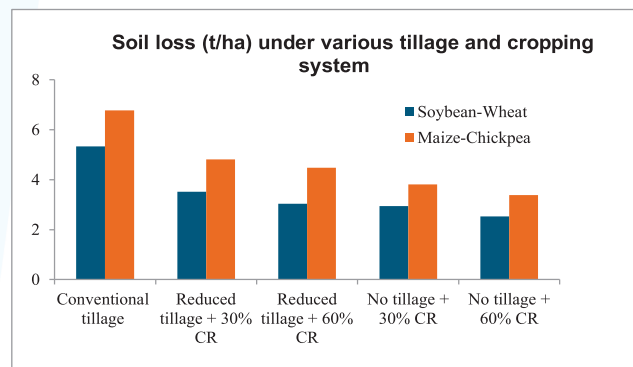
Development of water and nutrient management practices in conservation agriculture for Vertisols of central India under conservation agriculture

The field experiment was conducted under CRP-CA on the wheat crop during the rabi season, using three irrigation methods-flood (FI), sprinkler (SI, 80% FI), and drip (DI, 60% FI); three tillage systems-conventional (CT), reduced (RT), and no-tillage (NT); and four fertilizer treatments-100% RDF, 75% RDF, STCR, and LCC-based management. FI plots received 345 mm of water (5 irrigations), SI plots 285 mm (twice a week), and DI plots 224 mm (alternate days). Yield differences among irrigation methods were insignificant, but water use efficiency ($\text{kg ha}^{-1} \text{mm}^{-1}$) was highest in DI (22.9), followed by SI (18.2) and FI (15.0). DI and SI saved 12 cm and 6 cm of water, respectively, over FI. Tillage systems did not impact yield, with RT and NT performing similarly to CT, indicating potential energy and labour savings. Yield was slightly higher under STCR and LCC than 100% and 75% RDF.



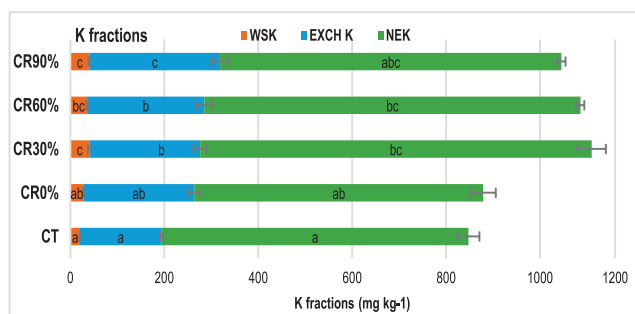
Minimizing runoff and soil loss through conservation agriculture practices in Vertisols

The average runoff ranged from 25.90% to 32.59% in the soybean-wheat system and from 28.40% to 35.54% in the maize-chickpea system, while soil loss varied between 2.53 and 5.34 t/ha and between 3.82 and 6.77 t/ha, respectively, under different tillage treatments. Adopting conservation agriculture reduced runoff by up to 21% in both systems and lowered soil loss by 44-53% in Vertisols compared to conventional cultivation.



Effect of different levels of crop residue retention on potassium availability and quantity-intensity relationship under conservation agriculture

Soil samples (0-10 cm) from an ongoing CRP-CA experiment were analyzed for K fractionation and Quantity-Intensity (Q/I) studies. Treatments included four crop residue retention levels under no-tillage: CR0 (0%), CR30 (30%), CR60 (60%), and CR90 (90%), plus conventional tillage (CT) without residue. Results showed K pools (water-soluble, exchangeable, and non-exchangeable) were lower in CT and CR0% plots compared to CA plots with residue retention. Higher residue levels generally increased K fractions, with CR30, CR60, and CR90 being statistically equivalent for WSK and NEK. However, CR90 significantly outperformed all treatments in exchangeable K and available K fractions. Q/I analysis indicated the highest labile K (quantity factor) and equilibrium activity ratio (intensity factor) in CR90% plots, while CT had the lowest. The potential buffering capacity was consistent across treatments. This study highlights the importance of residue addition in enhancing soil potassium (K) availability for sustainable agricultural management.



Potassium fractions as affected by different levels of residue retention under CA

Developed soil test-based integrated plant nutrient supply (IPNS) modules for wheat crop in Vertisols

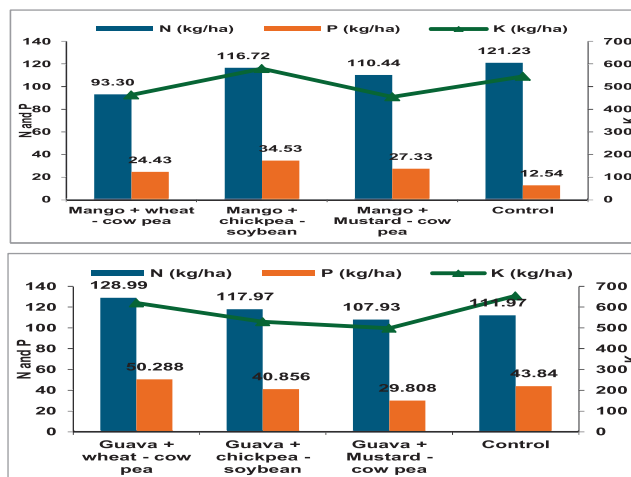
Twelve nutrient management modules viz., General recommended dose/ farmers practices (GRD), Soil Test Crop Response (STCR) based fertilizers (inorganic modules), IPNS modules (STCR based 75% NPK along with 25% organic sources of nutrients), organic modules (integration of farmyard manure, vermicompost, urban compost, crop residue and glycidia loppings) were investigated in wheat crop. Results showed that IPNS modules significantly improved wheat yield over inorganic and organic modules. The highest yield was recorded with STCR-based 75% NPK + FYM @ 5 t/ha, followed by STCR-based 75% NPK + FYM @ 20 t/ha (once in 4 years)

and 75% NPK + vermicompost (VC). In contrast, organic treatments like CR 5 t/ha + 1.5 t VC + Gly 2 t/ha and CR 5 t/ha + 5 t FYM + Gly 2 t/ha had no significant impact on grain yield.



Effect of agri-horticultural system on soil health and produce quality

Agri-Horti systems were developed in mango, guava, lime, and aonla orchards with intercropping combinations such as mango + wheat-cowpea, mango + chickpea-soybean, and mango + mustard-cowpea, along with similar systems in the other orchards. Legume-based intercropping, particularly chickpea and soybean, significantly improved soil health, nutrient content, and produce quality across all orchards. Among the four orchards, carbon build-up was highest in aonla, followed by guava. While aonla had the highest leaf fall (818.33 kg/ha/year), guava contributed more nutrients to the soil, supplying 13.86 kg/ha of nitrogen, 1.42 kg/ha of phosphorus, and 10.16 kg/ha of potassium annually.



Effect of agri-horti systems on NPK content in soil of different orchards



Gas exchange, grain yield and nutrient use efficiency traits of selected wheat cultivars in Vertisols of Central India

A field experiment was carried out to assess the genotypic variation in gas exchange, grain yield, and N & P use efficiency of 24 wheat cultivars in Vertisols under four nutrient levels (0% NPK, 100% NPK, 50% N + 100% PK, and 100% NK + 50% P). Results showed HI 1663, HI 1544, HI 1605, and DBW 88 had high photosynthetic rates, while HI 1544, HI 1605, HI 1531, HI 8498, HI 1500, Narmada 14, DBW 88, and BWL 5233 showed high stomatal conductance under low N. Lower transpiration was recorded in HI 1531, HD 2687 (low N plot) and HI 8663, HI 8713, HI 1605, HI 1531, GW 322 (low P plot). These genotypes also exhibited variations in chlorophyll fluorescence, indicating tolerance to abiotic stress. Cultivars HI 8737, HI 1563, HI 1605, HI 1531, HI 8498, and Narmada 14 exhibit high biomass (over 10 tons/ha) and grain yield (over 4 tons/ha), making them suitable for low-nitrogen conditions. For low phosphorus conditions, HI 8713, HI 1544, HI 1605, HI 1531, GW 322, and HI 1500 are effective based on their performance. These genotypes can be effectively utilized in crop improvement programs to better exploit nutrient-deficient or constrained ecosystems with reduced environmental impact.



Documented Indigenous knowledge and farm management practices of tribal farmers of Balaghat district

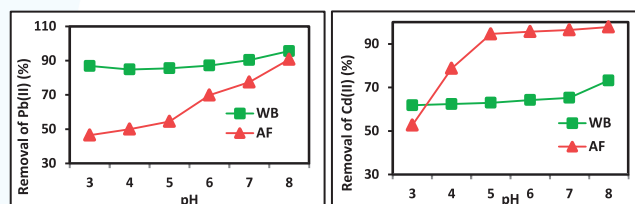
Participatory Rural Appraisal (PRA) in 13 tribal villages resulted in the development of agroecology maps, documentation of socio-economic development, and an emphasis on indigenous agricultural knowledge. Investigations into local medicinal practices revealed that tribal healers utilize various forest plants to treat conditions such as fever, high blood pressure, and skin diseases. Soil samples from 90 fields across 8 villages revealed an

average pH of 5.98, 0.85% organic carbon, and varying levels of nutrients, including 215.6 kg/ha nitrogen and 87.83 ppm manganese.



Effects of pH on the adsorption of Pb (II) and Cd (II) by activated fly ash and biochar

This study utilized activated fly ash (AF) and wheat straw biochar (WB) to investigate the adsorption of Pb(II) at 50 mg/L and Cd(II) at 5 mg/L across a pH range of 3 to 8 at 308 K. WB achieved a maximum removal of 96.4% for Pb(II) at pH 8.0, while AF reached 90.7%. WB maintained an over 88% removal rate across the entire pH range. For Cd(II), maximum removal was 97.7% for AF and 73.2% for WB at pH 8.0, with AF showing negligible pH effects from 5-8. Higher pH levels enhance the adsorption and precipitation of metal ions, resulting in effective wastewater treatment using WB and AF across a wide range of pH levels.

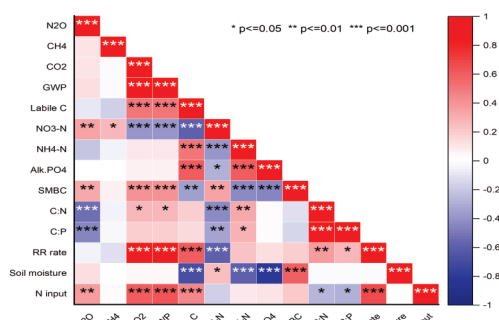
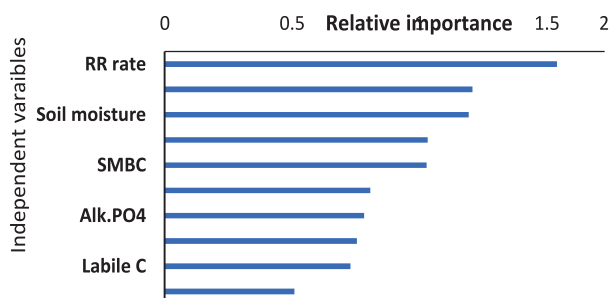


Machine learning approach for greenhouse gas estimation in residue returned soils

Partial least squares (PLS) modelling and Spearman correlation analysis were used to examine the relationship between greenhouse gas (GHG) emissions and predictor variables. A significant positive correlation ($p \leq 0.01$) was found between N_2O emissions, nitrogen input, NO_3-N , and SMBC, while C:N and C:P ratios showed a negative correlation. For CH_4 , only NO_3-N was significant ($p \leq 0.05$). Management practices influenced soil properties, with SMBC, labile C, and management variables showing positive correlations ($p \leq 0.01$) with CO_2 and GWP, but negative correlations with NO_3-N . The PLS model identified two factors that accounted for 55.49% of the predictor variance and 38.34% of the GHG responses, highlighting that N_2O emissions were highly influenced (values > 0.8) by management and soil properties in Alfisols. The importance ranking for GHG flux projection was: RR rate >

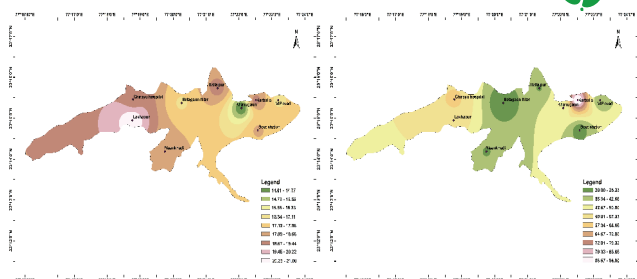


N input > soil moisture > NO₃-N > SMBC > C:N > Alk. PO₄ > C:P > labile C > NH₄-N. The model was significant ($p < 0.05$) for estimating CO₂ ($r^2 = 0.83$), N₂O ($r^2 = 0.54$), and CH₄ ($r^2 = 0.17$).



Spatial variation of entropy water quality index (EWQI) representing drinking water suitability during (a) monsoon (b) post-monsoon seasons in Bhojtal wetland (Upper Lake)

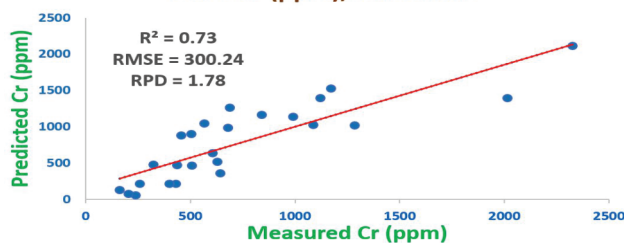
A drinking water quality assessment was conducted at nine stations in the Bhojtal wetland to evaluate the water suitability for human consumption during the monsoon and post-monsoon seasons. The entropy water quality index (EWQI) was calculated based on fourteen parameters, revealing a shift from excellent water quality (100% samples) in monsoon to good (67%) and medium (33%) in post-monsoon. During the monsoon, the most influential parameters were SO₄²⁻, BOD, and K⁺. In contrast, during the post-monsoon period, K⁺, Na⁺, and BOD had the greatest impact. Overall, concentrations of all parameters increased significantly post-monsoon season. Specifically, the samples collected from Karballa, Chirayu Hospital, and Lakhapur exhibited a greater increase in concentration in different water quality parameters under study. The spatial maps for water quality clearly indicate a decline in water quality with the seasons for the Bhojtal wetland.



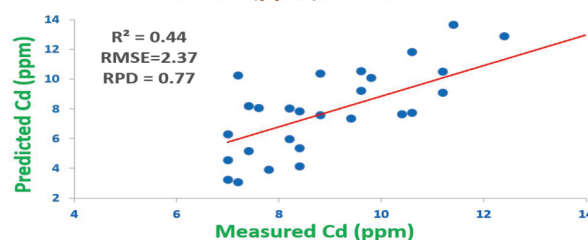
Assessment of soil heavy metals of Jajmau industrial area, Kanpur using VNIR soil spectra and machine learning algorithms

VNIR soil spectra and machine learning models, such as PLSR and ANN, were used to evaluate chromium, cadmium, lead, and iron concentrations (ppm) in contaminated soil from Jajmau, Kanpur. The models were evaluated on an independent dataset using statistical criteria, including RPD, R², and RMSE. The PLSR model yielded R² values of 0.73 for chromium and 0.44 for cadmium, with RMSEs of 300.24 PPM and 2.37, respectively, indicating reasonable accuracy. For lead and iron, the ANN model showed a better fit, with R² values of 0.46 and 0.13, and RMSE values of 9.26 and 2,331.71 PPM, respectively.

PLSR-Cr (ppm), Validation



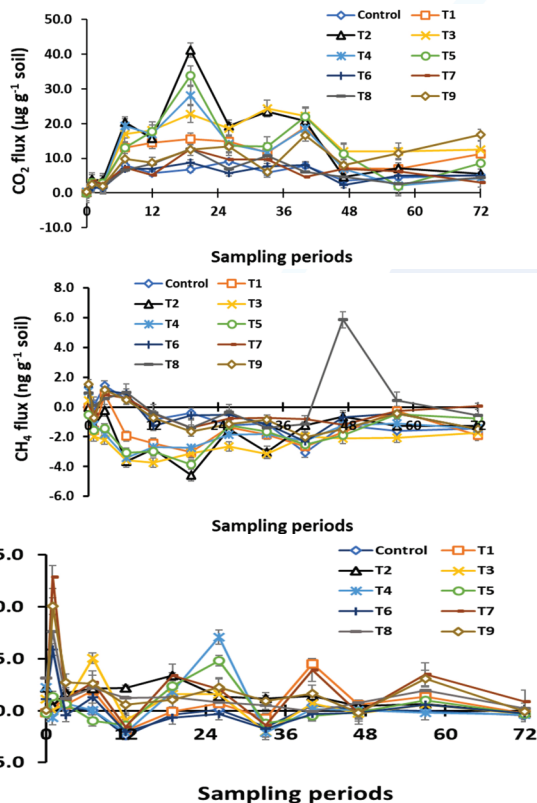
PLSR-Cd (ppm), Validation



Effects of municipal sludge and biochar combination on GHG emission and soil properties

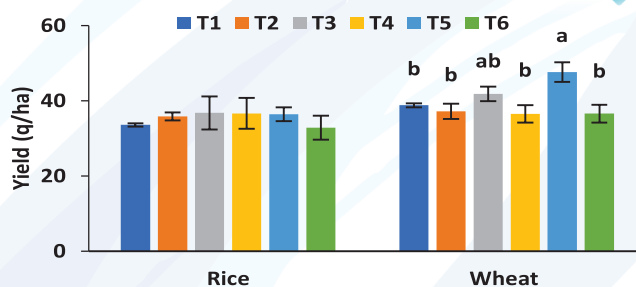
Fresh municipal sludge treatments exhibited significantly higher emissions of greenhouse gases (CH₄, CO₂, and N₂O) than solarized sludge. Higher rates of fresh sludge led to greater cumulative emissions. The addition of biochar, reduced gas emissions in both treatment types, indicating its potential to mitigate greenhouse gas flux. Heavy metals, such as Fe, Mn, Zn, and Pb, were found in higher

concentrations in the top 15 cm of soil with fresh sludge, although their total and bioavailable levels were below USEPA limits. Biochar appears to stabilize these metals, reducing their mobility and leaching into deeper soil layers, which may lower the risk of groundwater contamination. Soil pH adjustments from sludge and biochar treatments corresponded with decreased metal mobility, as these metals are less mobile in neutral to slightly basic soils.



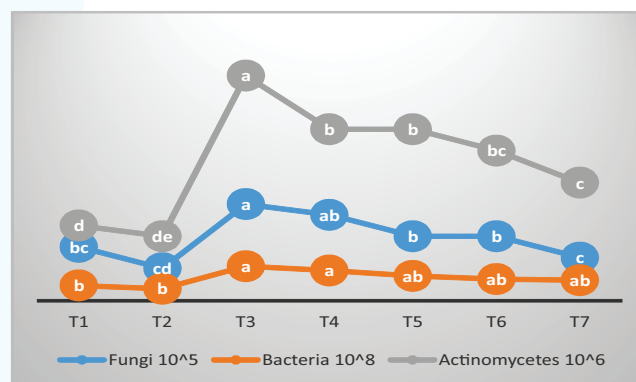
Effect of in-situ decomposition of crop residue mediated by lignocellulolytic microbes on crop yield under Rice-Wheat cropping system

A research trial at ICAR-IISS evaluated the long-term effects of the ICAR-IISS Excel decomposer, a microbial consortium designed to accelerate the decomposition of lignocellulosic residues, on soil health in the rice-wheat cropping system of central India. The study included six treatments: T1, Residue incorporation; T2, Microbial consortia applied to residue; T3, Microbial consortia applied to residue + urea; T4, Residue removal; T5, Residue burning; T6, Residue retention. After one year, there was no significant effect of residue management treatments on rice yield. However, the application of microbial consortia, with or without urea, impacted wheat yield.



Deciphering thermophiles from hot springs of Central India for rapid decomposition of crop residues

The experiment used a randomized block design (RBD) with seven treatments and three replications: control (T1), residue burning (T2), residue incorporation with Thermophilic consortia (T3), EKCEL decomposer (T4), Pusa decomposer (T5), waste decomposer (T6), and no consortia (T7). After harvest, microbial populations and enzyme activities were compared. Results showed T3 had a significantly higher actinomycetes population (21×10^6), and its bacterial and fungal populations matched those in T4. Enzyme activities were also significantly higher in T3 compared to control and burning treatments.



Effect of different decomposers on microbial population

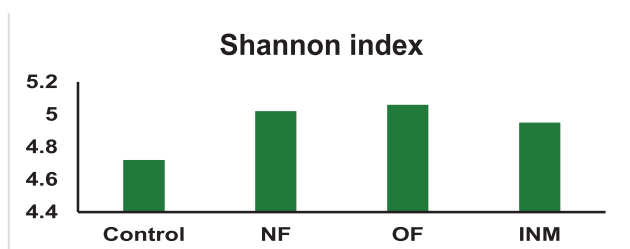
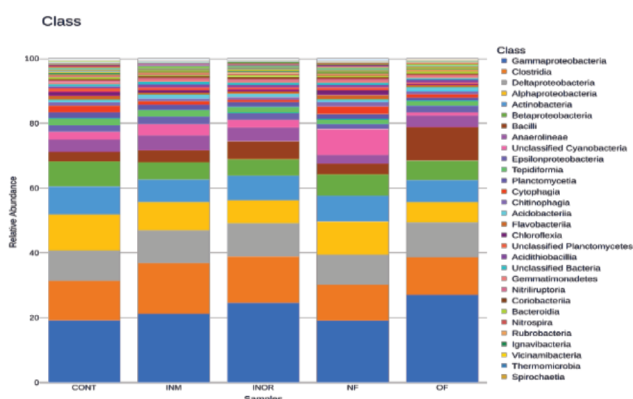
Cross nodulation ability of slow and fast-growing pigeon pea rhizobia across intra and inter-species leguminous crops

The study evaluated 48 rhizobial isolates from pigeon pea, comprising 27 slow-growing and 21 fast-growing isolates, for plant growth-promoting (PGP) traits. Fast growers produced more indole acetic acid (IAA) ($50 \pm 4.4 \mu\text{g ml}^{-1}$) than slow growers ($34 \pm 5.1 \mu\text{g ml}^{-1}$). Among slow-growing plants, 87% showed nitrate reduction, while fast-growing plants demonstrated higher rates (90%). The best-performing isolates were identified, and sequencing revealed they were related to Bradyrhizobium, Rhizobium, and Sinorhizobium. Slow-growing cultivars Asha and MKK ICPH 2740 were effectively nodulated, while fast-growing

cultivars were better suited for ICPL 332 WR and ICPL 14003. All tested isolates nodulated legumes in the order: *Vigna radiata* > *Cajanus cajan* > *Vigna mungo* > *Sesbania cannabina* > *Glycine max*, with no nodulation observed in *Trigonella*, *Trifolium*, *Arachis*, *Lens*, or *Pisum*. The study concluded that combining slow (BRP20) and fast (BRP8) rhizobia could optimize pigeon pea and other legume productivity.

Assessment of microbial diversity organic and natural farming practices

Microbial diversity was found to be higher for organic and natural farming treatments compared to all other treatments. Among bacterial phyla, Proteobacteria, Firmicutes, Actinobacteria, Chloroflexi and Bacteroidetes were the dominant phyla across the treatment. Proteobacteria was the dominant phyla of bacteria with the highest proportion under organic farming. Comparing the bacterial classes within the Proteobacteria, Gamma proteobacteria was the most prominent class. The proportion of alpha and beta proteobacteria was found to be higher under natural farming treatment compared to other treatments. The proportion of different microbial genera was identified based on the sequence. Among the different genera, *Desulfallaxis*, *Pseudomonas*, *Acinetobacter*, *Bacillus*, and *Serratia* were identified as the predominant bacteria across the treatments, with varying proportions.



Microbial diversity under organic and natural farming treatment

Development of a prescription equation based on soil test-crop response correlation.

Several prescription equations for fertilizer and organic amendments were developed based on soil test crop response (STCR) correlations for the following crop varieties. The development of such equations involved field trials, laboratory soil testing, and analysis of crop yield response to applied nutrients.

Crop (Variety)	Equation
Jute (JRO M1)	FN = 4.89 T-0.52 SN-0.34 ON FP = 1.60 T-1.06 SP-0.18 OP FK = 3.00 T-0.55 SK-0.07 OK
Garlic (Local)	FN = 5.62 T-0.52 SN-0.42 ON FP = 2.11 T-1.92 SP-0.30 OP FK = 3.36 T-0.55 SK-0.19 OK
Onion (N2-4-1)	FN = 0.65 T-0.51 SN-5.05 ON FP ₂ O ₅ = 0.39 T-3.06 SP-5.22 OP FK ₂ O = 0.38 T-0.15 SK-4.04 OK

FN, FP₂O₅ and FK₂O are the fertilizer doses (N, P₂O₅ & K₂O) in kg ha⁻¹, T is target yield (q ha⁻¹), SN, SP and SK are soil available N, P & K in kg ha⁻¹ and ON, OP & OK indicates the doses of N, P and K applied through FYM in kg ha⁻¹.

EXTENSION ACTIVITIES

Demonstration of Best-Bet Conservation Agriculture Practices on Farmers' Fields in Vertisols of Central India

Participatory field experiments (12 with wheat and 8 with chickpea) were conducted during the 2024 rabi season in Khamkheda, Raslakhedi, Raipur, and Karodkhurd villages to evaluate different crop establishment techniques-zero tillage (ZT), reduced tillage (RT), and conventional tillage (CT). The ZT produced higher grain yields for both crops than RT and CT.



Dr RK Singh, Asit Mondal, Jitendra Kumar and Dhiraj Kumar conducted the Training-Cum-Agricultural Input Distribution Programs on "Soil Health Management" at KVK Barwani on February 7-8, 2024, under the TSC-TSP project. Approximately 40 tribal farmers attended the program, which aimed to promote agricultural techniques such as soil testing, organic farming, integrated nutrient management, and conservation agriculture. Vermicompost packets and drumstick planting material were also distributed to the farmers during the training.



Seventeen demonstrations from October 2023 to March 2024 were conducted to showcase the effective use of fertilizers and integrated nutrient management. These demonstrations on the cultivation of wheat and chickpeas were conducted in farmers' fields in the villages of Agaria, Chapar, Magalia Kot, and Jagdishpur under the SCSP program. Fertilizers and seeds of soybeans and Maize were distributed to farmers in various villages of the Bhopal district under the SCSP project. Further, on March 7, 2024, a successful field-day demonstration was conducted in Agaria village, showcasing the application of pesticides utilizing drone technology.



Farmers field day was organized at Ratanpur village near Bhopal on 16 February 2024. The program was under CRP on CA and coordinated by Dr B.P. Meena and Dr Manish Kumar (ICAR-CIAE, Bhopal).



Drs Pramod Jha, Khushboo Rani, Abinash Das, Jitendra Kumar, Vassanda Coumar and Sudeshna Bhattacharjya demonstrated the technologies of ICAR-IISS, Bhopal, at Science Fiesta, held at Regional Science Centre, Bhopal from 10-12th January 2024.



Dr Khushboo Rani organized the visit of students of Saheed Bhagat Singh Government Degree College, Asta, Sehore on 30 January. She also coordinated the visit of Agri Input Distributors under KVK, Atma (Raisen), M.P. on 12 March 2024.



Dr Jitendra Kumar, Dr Abinash Das, Dr Khushboo Rani, and Dr S.K. Badodiya, Incharge, KVK, Barwani, conducted the Training-Cum-Agricultural Input Distribution Programs at KVK Barwani on June 25, 2024. Agricultural inputs, including 15 quintals of soybean seeds and 30000 chilli seedlings, were distributed to the participants from various villages.



Frontline demonstrations (FLDs) under the farmer FIRST programme on resource-conserving technologies were conducted in 60 fields across six villages in Bhopal district, covering 24.28 hectares for wheat (40 FLDs) and chickpea (20 FLDs). The average yields were 46.68 q ha⁻¹ for wheat and 15.97 q ha⁻¹ for chickpea, compared to 41.81 q ha⁻¹ and 14.29 q ha⁻¹ under farmers' practices, respectively.



Under the livestock module of the Farmer FIRST programme, chicks and feed were distributed to 40 farmers from Khajuri and Barkhedhi Hajjam villages in the Bhopal district on January 31, 2024. Additionally, exposure visits were organized for farmers under the Farmer FIRST programme to the composting unit and worm mother culture unit of ICAR-IISS, Bhopal, on March 6th and 7th, 2024 and April 23rd 2024 to enhance their knowledge and skills in vermicomposting.



A farmer field school was conducted in the Paraswada Block of Balaghat district in Madhya Pradesh during 04-08 February, 2024 to sensitize tribal farmers of Sonewani, Kanhatola, Irali, Mohanpur, Uskalchak, Kulpa and Latta villages about the importance of soil health and soil test based nutrient management for healthy crop growth. A Participatory Rural Appraisal (PRA) was conducted in Khajuri village on 18 March 2024.



A five-day training program was conducted on "Climate Resilient Agriculture through Regenerative Farming Practices" Under the NICRA Project" from 27th February to 02nd March 2024. Also distributed spraying pumps to the farmers under the NICRA project.



As part of the Swachhta Campaign, the institute conducted various training programs across multiple villages, successfully engaging 445 farmers and members of the civil society. In Rasuliya Pathar, Ratibad, Kalakhedi, and Ratanpure villages, the initiative included the distribution of 55 kg of worm mother culture to farmers for use in their portable vermibeds. Along with this distribution, farmers received valuable guidance on the aftercare of these beds, covering essential practices such as watering, moisture management, and protection against insects and predators.



Swachhata awareness campaigns were held in adopted villages, engaging 155 farmers and students. Participants learned about the harmful effects of crop residue burning on soil health, management of crop residues through vermicomposting and microbial decomposers, and the importance of sanitation in farms and villages.



Microbial cultures were scaled up in the lab to prepare capsules for farmers. These capsules were distributed and demonstrated for in situ decomposition of wheat residue at 4 farmers field namely Bhagvan Singh Meena (Beenapur), Pehlad Malviya (Khajuri), Santosh Rajput (Khajuri), Ramesh Rajput (Khajuri).



Kisan Sangosthi and input distribution program was organized at ICAR-IISS, Bhopal, on the 6th and 7th of March, as well as the 30th and 31st of May, 2024. This event was specifically aimed at Scheduled Caste (SC) farmers under the Scheduled Caste Sub-Plan (SCSP) under the CRP on CA. During these sessions, agri-input were distributed, including 4.0 tonnes of vermicompost, 150 mango seedlings, 150 guava seedlings, and 110 lemon seedlings. Additionally, farm implements, two-wheel hoes, were provided to the participating SC farmers to enhance their agricultural practices. Furthermore, in the adopted villages under the project titled "Demonstration of



Best-Bet Conservation Agriculture Practices on Farmers' Fields in Vertisols of Central India," also supported by CRP on CA, additional inputs were distributed. These included 480 kg of wheat seeds, 240 kg of chickpea seeds, 20 bags of NPK fertilizer (12:32:16), and herbicides comprising 10 liters each of glyphosate and paraquat. This extensive distribution aimed to promote sustainable agricultural practices and enhance productivity in these regions.



Online Collaborative Training Program of ICAR-IISS Bhopal and MANAGE Hyderabad on the topic "Building climate resilient agricultural systems through community-based approaches" during 10-14 June, 2024 (Coordinators: IISS - Shinogi KC, Sanjay Srivastava, Immanuel C Haokip; MANAGE - Balasubramani N and Sreelakshmi C).

A one-day training programme on "Economic Empowerment of Small and Marginal Farmers through Backyard Poultry Farming" was organized on 19th January 2024 for the farmers under the livestock module of the Farmer FIRST programme of ICAR-IISS Bhopal.



Drs Ajay and DK Yadav organized the SCSP Program on 22nd February 2024 at village Gunga. In this program, farmers were urged to keep the village open defecation free, maintain the village clean, adopt conservation agriculture to avoid burning the crop residue for environmental safety and soil health, and convert farm waste to vermicompost and compost.

Dr. Nisha Sahu explained the activities of ESS Division to students of Government Motilal Vigyan Mahavidyalaya, Bhopal on 12th February, 2024.



Dr Nisha Sahu, Dr. Jitendra Kumar, Dr. Abinas Das, and Khusboo Rani explained the institute's activities to students of Sam Global University, School of Agricultural Sciences, Raisen, on June 4, 2024.



On March 18, 2024, the MGMG team including Dr. Ajay, Dr. A.K. Tripathi, Dr. Abinash Das, and Dr. M.H. Devi. visited Nipaniya Sukha village in Bhopal District to raise awareness on sustainable agricultural practices and available technological resources for farmers.



Dr Asha Sahu, as a Coordinator, organized a visit of 25 trainees of the "Agri-Clinic & Agri-Business Centre Scheme (ACABC)" from the Indo-European Chamber of Commerce and Industry (IECCI) nominated by MANAGE, Hyderabad, on 08th January 2024 at IISS, Bhopal. Dr Asha Sahu also involved in organizing a visit of 40 farmers and briefed on "waste to compost" under the Swachhta Action Plan (SAP).

Dr Asha Sahu, as a Co-ordinator, organized a visit of 70 B.Sc. (Ag.) students of "Shri Vaishnav Institute of Agriculture, Indore" during their Educational Tour at IISS, Bhopal, on 09th January 2024. She also organized a one-day training on "Vermicomposting: Efficient way to enhance soil health" for 50 girls students of Gitanjali Girls College, Bhopal on 09th February 2024.



Programme/Training/workshops/seminar/meeting Organised

Foundation Day of ICAR IISS Bhopal

The ICAR-Indian Institute of Soil Science (IISS), Bhopal celebrated its 37th Foundation Day on April 16, 2024. Dr. S.K. Chaudhari, Deputy Director General (Natural Resource Management) at ICAR in New Delhi, attended the event online as the Chief Guest. Dr. A. Velmurugan, Additional Director General (Soil and Water Management) at ICAR, and Dr. P.K. Sharma, former Vice Chancellor of SKUAST Jammu, were present as Guests of Honour. During the celebration, former Institute Directors, Dr. P.N. Takkar, Dr. C.L. Acharya, Dr. A. Subba Rao, Dr. A.K. Patra, and Dr. Pradip Dey-addressed the gathering as special guests. Additionally, Dr. S.P. Datta was recognized and felicitated for his twenty-nine years of dedicated service at ICAR.



Sixth Quinquennial Review Team (QRT) meeting of ICAR IISS Bhopal

The first meeting of the Quinquennial Review Team (QRT) took place on May 20-21, 2024, to assess the work of the ICAR-Indian Institute of Soil Science (ICAR-IISS) and various AICRPs from 2018-23. During the meeting, the member secretary presented the Action Taken Report on previous recommendations, and the schedule for interactions with scientists from various AICRPs across the country was finalized.



International Women's Day Celebration

The women's cell of ICAR-Indian Institute of Soil Science organized the International Women's Day program on 7 March 2024. A one-day training cum exposure visit was organized to sensitize and train the farm women on "Recycling and Reuse of Agro-waste for Sustainable Agriculture" About 150 farm women, including the scientist and technical staff of the Institute, participated in the program. The Chief Guest, Mrs. Padmapriya Balakrishnan (IFS), in her address on the theme "Invest in Women Accelerate Progress," highlighted the need to invest in women because of her crucial role in conserving and preserving forests and wildlife.



ICAR-IISS organised the National Campaign on Soil Health Management & Composting under Life Style for Environment (LiFE) on 23 April 2024.



ICAR sponsored a Short Course on "Soil pollutants impact assessment and remediation of contaminated Soil" from 12-21 February 2024. (Course Director: Drs. M. Vassanda Coumar; Course Co-Directors: Abhijit Sarkar and Dinesh Kumar Yadav).



Kisan Mela/Workshop cum training program at KVK, Surgi Rajnandgaon, Chhattisgarh during 26-29 February, 2024 (Drs. Prabhat Tripathi, R. Elanchezhian, M.V. Coumar, Nisha Sahu, Narayan Lal and D.K. Yadav).





5 days Training Programme on “Water Quality Assessment and its Management for Sustainable Use in Agriculture” sponsored by the Ministry of Jal Shakti during 4-8 March, 2024 (Course Director: Drs. M. Vassanda Coumar; Course Co-Directors: Abhijit Sarkar, Dinesh Kumar Yadav, Sangeeta Lenka, Tapan Adhikari and J.K. Saha).



3 days training programme on "Soils of India for Fruit Production" at ICAR-IISS, Bhopal sponsored by VNR, Nursery, Raipur, Chhattisgarh during 5-7 June, 2024 (Course Director: Dr. Narayan Lal; Course Co-Director: Dr. Nisha Sahu; Dr. Khushboo Rani; Seema Bhardwaj).

S. Bhattacharjya, K Bharati, A. Sahu, A. Mandal, J.K. Thakur, M. H. Devi and A. Das organized High-End Workshop (Karyashala) on “State-of-the-art instrumentation for appraising soil biogeochemical processes and microbial diversity with respect to soil-climate feedback response”, 4-13th March, 2024, at ICAR-IISS Bhopal.

S.P. Datta, S.R. Mohanty, A. Mandal, J.K. Thakur, A. Sahu, S. Bhattacharjya, K. Bharati, A. Das and M.H. Devi organized a training programme on soil nutrients and biological health management for millet production”, 26-30 June 2024, at ICAR-IISS Bhopal.

Drs R. Elanchezhian, Prabhat Tripathi, MV Coumar, Nisha Sahu, Narayan Lal and DK Yadav organized Kisan Mela and Workshop cum training program for 300 farmers at KVK, Surgi Rajnandgaon, Chhattisgarh, during February 26-29, 2024.

The Staff Recreation Club of ICAR IISS organized the SBI Connect program on March 15, 2024, in coordination with SBI, Bhopal, to which all scientists and staff participated.

Organized a Training Programme on “Soil Health Management for Sustainable Agriculture” 30th May to 3rd June 2024 for Agriculture Extension officers and Farmers of Bihar (ATMA Begusarai, Bihar) (Course Director's: Dr. Pramod Jha, Dr. B.P. Meena, Dr. Khushboo Rani, Dr. S.K. Behera)

Drs. RK Singh, Asit Mandal, Jitendra Kumar, Dhiraj Kumar and Dr S.K. Badodiya organized a Training-cum-input distribution and field day program for 50 farmers at KVK, Barwani, during 7-8 February 2024.

Dr SR Mohanty organized a National Campaign on Soil Health Management & Composting under Lifestyle for Environment (LiFE) to 1000 participants (Co-Organizing Secretary: Drs. JK Thakur and Asha Sahu) on 23.04.2024. Dr Asha Sahu organized a one-day workshop for 35 tribal farmers on “Soil Conservation” on 21/05/2024 at ICAR-IISS, Bhopal.

Drs. S.R. Mohanty, K Bharati, Asha Sahu, Asit Mandal, J K Thakur, M Homeshwari Devi, and Abinash Das organised a 5-day farmer's training programme on "Soil Nutrient and Biological Health Management for Millets Production" from 26-30 June 2024.

Dr. Sanjay Srivastava organised a virtual lecture on "Power of Intellectual Property Rights" by Dr. Debashis Chattopadhyay, on World Intellectual Property Day 2024 30 April

Awards/Honors/Recognitions

- Dr. Narayan Lal received the Young Horticulturist Scientist Award from the Society for Horticultural Research and Development, UP, during the 3rd Indian Horticulture Summit-Cum-International Conferences-2024 on Technological Intervention for Boosting Horticultural Production during 1-3 February 2024 at RARI, Durgapura, Jaipur, Rajasthan. He also received Young Scientist Award 2023-24 from the Society for Advancement in Agriculture Technology and Development, Uttarakhand, India.
- Dr. BP Meena received IASWC Young Scientist Award for the year 2022 during the National Conference on Living with Nature: Soil, Water & Society in Ecosystem Conservation (LNSWSEC-2024) on June 20-22, 2024.
- Shri Hem Raj Yadav received the IARI Innovative Farmers Award -2024 at IARI, New Delhi on 6th June, 2024 (under CRP on CA)



- Dr. Shinogi awarded with Best Paper Award for the paper "Indigenous agriculture knowledge of tribal farmers in Madhya Pradesh for land resource management and sustainable food system" in the National Conference on Next Generation Agriculture-Organic and Natural Farming Pathways: Extension Strategies & Approaches organized by International Society of Extension Education at ICAR-ATARI Jabalpur, Madhya Pradesh during 28-30 January, 2024.
- Dr. Shinogi awarded with Best Paper Award for the paper "Eco-friendly nutrient management interventions for improved yield and income from the tribal farmlands of Madhya Pradesh" in the National Seminar on Transformative Agriculture and Sustainable Development: Rethinking agriculture for a changing world organized by the Society for Community Mobilization for Sustainable Development (MOBILIZATION), New Delhi during 05-07 March 2024.
- Dr. Alka Rani received the Young Scientist Award at the 39th M.P. Young Scientist Congress and Science Festival, held at the Madhav Institute of Technology & Science, Gwalior, from February 21 to 23, 2024.
- Dr. N. K. Lenka, as Director's nominee, attended the QRT Interaction meeting at ICAR-NIASM, Baramati, during 12-13 April 2024.
- Dr. Abhijit Sarkar received the best oral presentation award for the paper "Municipal Sludge a Good Soil Amendment for Plant Growth" at the 11th Annual Convention and National Webinar of the Society for Fertilizers and Environment on 23-24 February 2024.
- Dr. D.K. Yadav served as an external examiner for the University of Agriculture, Kota, Rajasthan, during the 2023-24 academic session.
- Dr. Sangeeta Lenka served as Co-chairperson of the technical session "Natural Resource Conservation Practices and Their Role in Ecosystems and Biodiversity" at the 11th Annual Convention and National Webinar of the Society for Fertilizers and Environment, held on February 23-24, 2024.
- Dr. Nisha Sahu received the Distinguished Women Scientist Award 2023-24 from SAATD, Uttarakhand.
- Dr. Nisha Sahu received the Global Young Scientist Award-2024 from the Agricultural Technology Development Society (ATDS), Uttar Pradesh.
- Dr. Sangeeta Lenka delivered a guest lecture in an online training program on "Carbon credits in Agriculture" on 14th March 2024, organized by the Extension Education Institute, Directorate of Extension, Dept. Of Agriculture and Farmers Welfare, Professor Jayashankar Telangana State Agricultural University, Rajendranagar, Hyderabad.
- Dr. Nisha Sahu is recognized as a Member of the Editorial Board of Agriculture Letters.
- Dr. Nisha Sahu was recognized as an Editorial Board Member of the American Journal of Environmental Science and Engineering (AJESE) from September 9, 2022, to September 9, 2024.
- Dr. Abinash Das elected as Councillor (Central Zone) for The Clay Minerals Society of India (CMSI) during the Executive Council meeting of the Clay Minerals Society of India (CMSI), New Delhi, held online on May 12, 2024.
- Dr. Asha Sahu gave Keynote Presentation (online) on "Enhancing Soil Health through Improved Quality of Bio-Waste and Accelerated Decomposition using Microbial Consortia" at the 3rd World Conference on Recycling and Waste Management held on April 22, 2024, Berlin, Germany.
- Dr. Asha Sahu invited as an External Examiner for conducting the M.Sc. Microbiology IInd Semester Viva-voce Examination on 31st May 2024 at Department of Microbiology, Barkatullah University, Bhopal.
- Dr. Asit Mandal acted as external examiner held on 15 January 2024 for the evaluation of Ph.D thesis entitled "bioremediation of metal and metalloid polluted soils" by Ganpat Lauhar.
- Dr. Asit Mandal acted as member of External Advisory Board at the SYMBIOREM consortium meeting held online February 15, 2024.
- Dr. Asit Mandal received the Eminent Scientist of the Year Award 2023 by the National Environmental Science Academy, New Delhi
- Dr. Asit Mandal acted as associate Editor for Indian Journal of Soil Conservation and Frontiers in Soil Science
- Dr. Asit Mandal acted as academic Editor of the International Journal of Plant and Soil Science
- Dr. S. Bhattacharjya acted as an invited key speaker by Sri Sri University in the webinar on "Diverse microbiome-A future of soil restoration and soil health" on 29th February 2024.



- Dr. M Homeshwari Devi, certified as Excellence in reviewing Asian Journal of Agricultural and Horticultural Research (14th March, 9th April, 24th May 2024)
- Dr. B.P. Meena recognized as Editor in the Indian Society of Agronomy, New Delhi.
- Dr. B.P. Meena recognized as Associate Editor of the Indian Journal of Soil Conservation, Dehradun
- Dr. Francoise Bringe, Director of CNRS Research at the University of Strasbourg, France, visited IISS Bhopal for the 2nd annual meeting under the exchange visit program from March 6 to 10, 2024.
- Dr JK Thakur acted as an external member for the assessment of an IARI Student (Ms Sonam M., PhD student) for upgradation from JRF to SRF on 04th January 2024 (Online).

Scientist's Participation in Conferences/Seminars/ Trainings/Meetings /Workshops:

Name	Programme attended/ participated	Year 2024
All Scientists	Interaction Meeting called by the Hon'ble Director General (ICAR) with all Scientists of ICAR	5 January
All Scientists	Lecture on "Relevance of Ideology of Swami Vivekanand and Sri Ram Krishna Paramhansa in man making and Nation Building' by Dr PS Brahmanand, PD, WTC, ICAR-IARI	12 January
Drs. R Elanchezhian, Asha Sahu, S Bhattacharjya, Narayan Lal and M Homeshwari Devi	'AgriP 2024' online short course on Patents, jointly organized by IP&TM Unit, ICAR, New Delhi and Zonal Technological Management-Agribusiness Incubation centre at ICAR-CIFT, Kochi, Kerala	15 January to 15 February
Drs. RH Wanjari and Dhiraj Kumar	Virtual meeting of AICRP LTFE w.r.t. QRT 2012-17 ATR	16 January
Dr. R Elanchezhian	One-day refresher training program on the Accreditation process & techniques for accreditation of laboratories organized by NABL	19 January
Dr. Abinash Das	CAFT programme on "Advanced Forecasting Techniques in Agriculture Science Research" at ICAR-IASRI, New Delhi	24 January to 13 February
Dr. Shinogi KC	National Conference on Next Generation Agriculture-Organic and Natural Farming Pathways: Extension Strategies & Approaches	28-30 January
Dr. BP Meena	External Subject expert for the Research Degrees Committee (RDC) meeting of PhD aspirants in the subject of Agriculture at RKDF University, Bhopal.	30 January
All Scientists	Field IRC of ICAR-IISS, Bhopal	31 January
Dr. Narayan Lal	3rd Indian Horticulture Summit-Cum-International Conferences- 2024 on Technological Intervention for Boosting Horticultural Production at RARI, Durgapura Campus, Jaipur, Rajasthan.	1-3 February
Drs. BP Meena and Rahul Mishra	Demonstration of institutional technology in "All India Farmer's Fair & International Agriculture Technology Exhibition - 2024 at RVSKVV, Gwalior, M.P.	3-6 February
Dr. Sanjay Srivastava	Surveyed soils of tribal farmers in Balaghat, Madhya Pradesh and Farmers' field schools were conducted during the survey	3-7 February
Dr. Sanjay Srivastava	Refresher course of technical assessors organized by NABL, New Delhi.	9 February
Drs. SR Mohanty, Tapan Adhikari and NK Sinha	Six-monthly review meeting for foreign projects and presented the progress of the project at ICAR-CAZRI, Jodhpur	16-17 February

Drs. Nisha Sahu, Sangeeta Lenka, Abhijit Sarkar, Immanuel C Haokip, Madhumonti Saha and Narayan Lal	11th Annual Convention and National Webinar of the Society for Fertilizers and Environment, at Kolkata, West Bengal	23-24 February
Dr. Nisha Sahu	International Conference on Environment and Earth Sciences (ICEES-2024) organized by VDGOD Professional Association, India	24 February
Drs. Nisha Sahu, Narayan Lal, M Vassanda Coumar, Dinesh Kumar Yadav, Immanuel C Haokip and R Elanchezhian	National Conference on Novel Strategies for Mitigating Biotic and Abiotic Stresses for Agricultural and Environmental Sustainability, ICAR-NIBSM, Raipur (CG)	28-29 February
Dr. BP Meena	Scrutiny Committee Meeting for the application received for the Senior Scientist and Head, KVK position at RVSKVV, Gwalior, M.P.	29 February to 1 March
Drs. Narayan Lal and Dhiraj Kumar	Pedagogical Development Programme at, NAAS Complex, New Delhi	4-8 March
Dr. Shinogi KC	National Seminar on Transformative agriculture and sustainable development: Rethinking agriculture for a changing world	5-7 March
Dr. Immanuel C Haokip	Training of "Development of AI-based Android Application in Agriculture"	5-25 March
All Scientists	National workshop cum Midterm review meeting on "Use of fly ash in agriculture for sustainable crop production and environmental protection" Organized by ICAR-IISS Bhopal	12-13 March
Dr. Sangeeta Lenka	Current Methodologies for Water Footprint Estimation and Techniques for Water Saving (on virtual mode) organized by ICAR- Indian Institute of Water Management, Bhubaneswar	18-20 March
Dr. BP Meena	Workshop on Action Plan on Agriculture for Madhya Pradesh on 22 March 2024 at The State Institute of Agriculture Extension and Training (SIAET), Bhopal (M.P.) Organized by the Department of Agriculture and Farmers Welfare, Madhya Pradesh.	22 March
All Scientists	Annual General Body (AGB) meeting of the Bhopal Chapter-ISSS, Bhopal chapter of Indian Society of Soil Science	28 March
All Scientists	Online Meeting on Role and Importance of Secondary Agriculture, ICAR	8 April
All Scientists	Online meeting Ecoregional programme, ICAR	12 April
All Scientists	Participated in the 37th Foundation Day of ICAR-IISS, celebrated on 16th April 2024.	16 April
Drs. NK Sinha, Jitendra Kumar, Rahul Mishra, Nisha Sahu and Dhiraj Kumar	Follow-up cum Review Meeting of the NePPA project at ICAR-IISS, Bhopal	18 April
Drs. Immanuel C Haokip and M Homeshwari Devi	International Conference on Recent Advances in Agriculture for Atmanirbhar Bharat	19-21 April
Dr. M Homeshwari Devi	International Conference "Collaborative excellence in Multidisciplinary research" at Manipur International University	22-24 April
All Scientists	National Campaign on Soil Health Management & Composting under Lifestyle for Environment (LiFE) campaign of GOI, ICAR IISS, Bhopal	23 April



Drs. RH Wanjari, Seema Bhardwaj, NK Sinha and Dhiraj Kumar	Attended the Workshop on "Promotion and Dissemination of Climate Resilient Millet Technologies" organised by ICAR-VPKAS, Almora in online mode	26 April
Mrs. Madhumonti Saha	Attended Pedagogical Development Programme (7th Batch) at NAAS complex, New Delhi	29 April to 3 May
All Scientists	Participated in World Intellectual Property Day-2024. Dr. Debashis Chattopadhyay, Founder, Confiscare Hybrid Mind India Ltd. (Hyderabad) delivered a lecture on "Power of Intellectual Property Rights" in virtual mode	30 April
All Scientists	QRT meeting at ICAR IISS Bhopal during ICAR-IISS, Bhopal	20-21 May
Dr. SR Mohanty	Attended meeting on Second Level Evaluation on Indo-USA, Mission innovation project on carbon capture utilization and storage (CCUS) project and presented the project for funding at National Chemical Laboratory, Pune	22-23 May
Drs. NK Lenka and SR Mohanty	Completed Management Development Program (Pre-RMP) training at ICAR-NAARM, Hyderabad	3-14 June
Dr. Nisha Sahu	7th International Conference on Global Approaches in Agricultural, Biological, Environment and Life Sciences for Sustainable Future (GABELS- 2024)	8-10 June
All Scientists	Commodity presentation meeting of the Animal Science Division of ICAR in virtual mode	10 June
Dr. Immanuel C Haokip and Sanjay Srivastava	Organized online training program as Course Co-ordinators on "Building Climate Resilient Agricultural Systems through Community Based Approaches" on 10-14 June 2024 jointly ICAR- IISS, Bhopal & National Institute of Agricultural Extension Management (MANAGE), Hyderabad, Telangana	10-14 June
Dr. Nisha Sahu	Attended Training program on "Building Climate Resilient Agricultural Systems through community-based approaches" organized by ICAR-IISS & MANAGE	10-14 June
Drs. Narayan Lal, Nisha Sahu, Abhijit Sarkar and Khushboo Rani	Attended 5 days online training on IP tools viz. Copyrights, Design, Patent, Plant Variety, Trademarks, Geographical Indication (GI), and technology-licensing activities organized by IP&TM Unit, ICAR, New Delhi	12-16 June
Drs. S Bhattacharjya, Abinash Das, Asit Mandal, Asha Sahu, RH Wanjari and Dhiraj Kumar	Online IP Awareness Week Intellectual property and technology management unit ICAR, New Delhi and ICAR-IISWC, Dehradun	12-19 June
Dr. BP Meena	Regional Consultation on "Science of Natural Farming" at National Institute of Agricultural Extension Management (MANAGE), Hyderabad on June 14, 2024.	14 June
Drs. Sanjay Srivastava, RH Wanjari and SR Mohanty	QRT North Zone meeting of AICRP on STCR centre	27-29 June

Staff News:

- Shri Ganesh Kumar Meena joined on the post of Administrative Officer on 22.04.2024
- Shri Prahlad Rajak joined on the post of Technician T-1 on 26.04.2024
- Shri Sundram Lodhi joined on the post of Technician, T-1 on 26.04.2024
- Shri Pramod Kumar Chauhan, Technical Officer has been promoted to the post of Senior Technical Officer w.e.f. 15.02.2023 on 09.04.2024.
- Shri Jai Singh, Assistant Chief Technical Officer superannuated on 29.02.2024.
- Smt. Kavita Bai, Skilled Supporting Staff superannuated on 29.02.2024
- Shri Pramod Kumar Chauhan Technical Officer superannuated on 31.03.2024
- Shri Hukum Singh, Technical Officer superannuated on 31.03.2024

Other:

MoU signed between ICAR-IISS and Department of Agriculture, Government of M.P

An MoU for the "Optimal Ravine Management in the Chambal Landscape of Madhya Pradesh" project was signed by ICAR-IISS and the Department of Farmer Welfare and Agriculture Development on May 9, 2024, at Vindhaychal Bhawan, Bhopal. The signatories included Dr S. P. Datta, Director of ICAR-IISS, and Dr M. Selvendran, IAS, Commissioner, DFAD, in the presence of Dr N. K. Lenka, project PI; Dr R. Elanchezhian, PME Cell In-Charge; and Sh. R. Modi, Deputy Director of Agriculture M.P.



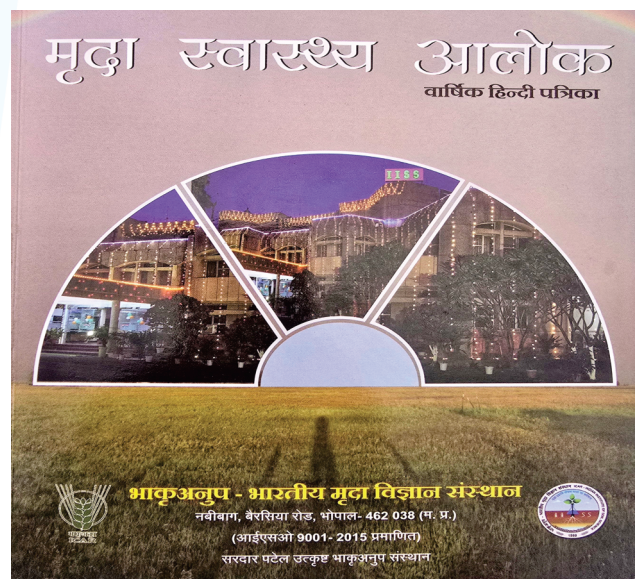
Technology Folder

Sahu Asha, Bhattacharjya S, Thakur JK, Mandal A, Devi MH, Bharati K, Das A, Tripathi AK and Mohanty SR (2024) Green Innovations: Biowaste Solutions Technologies for Circular Economy & Sustainable Agriculture. ICAR-IISS Technology Folder No.IISS/SBD/2024/01.



Edited Book

Tripathi AK, Sahu Asha, Mishra R (2024) Mrida Swasthya Alok. Published by ICAR-Indian Institute of Soil Science, Bhopal. pp 130.





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