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EDITORS

Director's Desk

Indigenous Mineral Resources for Self-Reliance in Chemical Fertilizers Use-A Step Towards Atmanirbhar Bharat

Fertilizers are essential for sustainable farming, as they restore soil nutrients, boost crop yields, and promote enduring soil health. In India, NPK fertilizer consumption surged from 65,000 metric tons in 1951-52 to about 29.8 million metric tons in 2022-23, driving food grain output from 52 million to 329.7 million metric tons. While staples like di-ammonium phosphate (DAP) and muriate of potash (MOP) fuelled this growth, their excessive use and heavy import reliance has sparked economic strains and environmental harm. India's dependence on imported phosphatic and potassic fertilizers burdens public finances, with a USD 18 billion subsidy in 2022-23 and $8.29 billion (~ 72,000 crore) in imports for 2024-25. This vulnerability threatens food security amid global market volatility. Recently, greater emphasis was given with respect to determining alternative sources of nutrients that are cost-effective, sustainable, and locally available. Shifting to cost-effective, sustainable, locally sourced alternatives is now a priority for Atmanirbhar Bharat. The minerals like glauconite, rock phosphate, mica, feldspar, and other silicate rocks, could be a better alternative to conventional fertilizers which can provide nutrients, boost soil fertility, and improve climate change resilience. Rock phosphate is a highly promising alternative, providing phosphorus that can be easily applied to acidic soils without the involvement of costly industrial treatment. Although phosphorus from rock phosphate enters the soil slowly compared to DAP, the slow release eliminates the likelihood of leaching and supports the long-term health of the soil. Likewise, silicate minerals like glauconite, mica, feldspar, and pyroxenes are slow-release sources of potassium and release secondary and micronutrients as well. Weathering of such naturally occurring minerals not only replenishes soil with macronutrients but also increases the soil cation exchange capacity thereby supporting soil health. In addition to their direct role in providing nutrients, these non-conventional minerals also contribute significantly to climate change mitigation. The weathering of calcium and magnesium-containing silicate rocks absorbs atmospheric CO_2, sequestering carbon in soil over the long term. This dual advantage of providing essential nutrients and sequestering greenhouse gases puts mineral-based fertilization as a cornerstone of emerging "nutrient smart technologies." In a nutshell, a shift from over-dependence on DAP and MOP imports to locally accessible domestic non-conventional materials like glauconite, rock phosphate, mica and other silicate minerals is an economic and environmental imperative which also provides a realistic means towards food and nutritional security under changing climatic conditions.

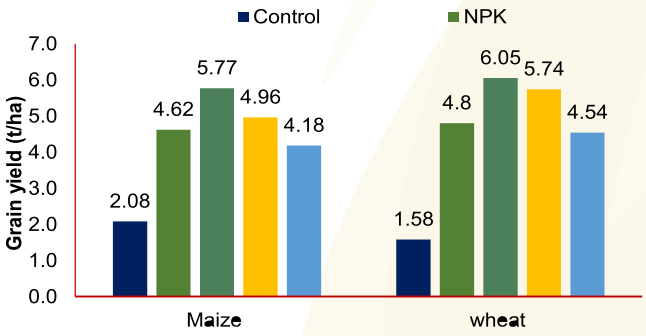
Indian endowed with numerous non-metallic minerals. Non-metallic minerals are crucial for Indian agriculture, with gypsum and phosphates (like apatite and rock phosphate) used to produce fertilizers that improve soil quality and crop yield. Other minerals such as limestone, dolomite, langbeinite, wollastonite, etc. are vital for soil conditioning, neutralizing acidity, and providing potassium, calcium, magnesium and sulfur. Low-quality minerals can be used in agriculture as a source of essential nutrients for plant growth and soil amendment, offering a sustainable alternative to conventional fertilizers. These minerals, often in the form of finely ground rock powders (also known as agro-minerals or remineralizers), is a slow-release source of nutrients and can improve soil health over time. India possesses varying degrees of availability for glauconite, rock phosphate, mica and silicate minerals. Glauconite, an iron-potassium silicate of green colour, comprises approximately 5–8.5% K_2O with iron, magnesium, silica, and minor elements like zinc and copper. Some glauconites are also rich in calcium and phosphorus. India possesses immense glauconite reserves of over 2,662 million tonnes, with significant deposits in Rajasthan, Madhya Pradesh and Uttar Pradesh. Mica waste is another valuable native source of potassium with 8-10% K_2O and occurs in abundance in Jharkhand, Bihar, and Andhra Pradesh. For phosphorus, India's availability base is relatively smaller. India has approximately 280 million tonnes of rock phosphate reserve, primarily in the states of Jharkhand (34%), Rajasthan (30%), Madhya Pradesh (19%), Uttar Pradesh (8%), Uttarakhand (8%) and Gujarat and & Meghalaya (1%). However, only approximately 15 million tonnes are high-grade reserves ($\geq$30% P_2O_5), whereas most are low-grade with high $CaCO_3$ impurities, limiting its direct use in fertilizer industries. Besides, India has a resource of polyhalite deposits of nearly 16,000 million tonnes with a peculiar multi-nutrient source with ~12% K_2O, 6% MgO, 19% SO_3, and 12% CaO. Utilization of agro-minerals and/or low-grade minerals as a source of phosphorous and potassium fertilizer will not only reduce the environmental problems but will also saves lot of money spent on import of P & K fertilizers. This approach cuts P and K import costs, reduces environmental risks, enhances resource efficiency, and strengthens soil health-aligning perfectly with Atmanirbhar Bharat's vision for self-reliant, climate-resilient agriculture.

Dr. Monoranjan Mohanty
Director

RESEARCH HIGHLIGHTS

Integrated plant nutrient supply modules for sustainable productivity in Vertisols

Twelve integrated plant nutrient supply (IPNS) modules, namely GRD, STCR-based NPK, integration of organic and inorganic, purely organic, and integration of different organic sources of nutrients, were evaluated in a maize-wheat system. The results showed that maize and wheat yield were significantly influenced by different nutrient management strategies. The highest grain yields recorded under INM modules, particularly, STCR-based 75% NPK + FYM @ 5 t/ha, followed by STCR-based 75%NPK + vermicompost (VC) as compared to GRD.



Grain yield of maize and wheat under different nutrient management modules

Crop residue retention affects crop productivity and soil health in soybean–wheat cropping system under conservation agriculture

The effect of zero tillage (ZT) with varying levels of crop residue retention (CR-90%, 60%, 30% and 0%) on crop productivity and soil health were studied in a soybean-wheat system . Soybean grain yield was the highest (1049.58 kg/ha) under 90% residue retention, which was significantly superior to conventional tillage (CT) (654.58 kg/ha) and at par with CR 30% (938.33 kg/ha) and CR 60% (909.58 kg/ha). Similarly, wheat grain yield was maximum under 90% residue retention (4922.9 kg ha^{-1}) followed by CR 60% (4845.8 kg ha^{-1}), CR 30% (4712.5 kg ha^{-1}), CR 0% (4475.0 kg ha^{-1}) and CT (4420.8 kg ha^{-1}).

Impact of crop residue and nutrient levels on crop productivity and soil health in maize-chickpea cropping system under conservation agriculture

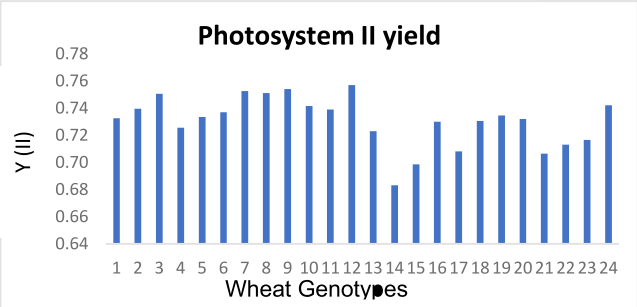
A study evaluated the effects of crop residue retention and optimized nutrient application on maize (NHM 1707)–chickpea (RVG-202) productivity and soil health. Maize grain yield varied significantly among treatments, with the highest yield (6689.17 kg/ha) recorded under 90% residue retention combined with 100% RDF (R90+N1). This treatment outperformed 60%, 30%, and 0% residue levels. Significant interaction effects were observed, with R90+N1 being superior yet statistically comparable to R60+N3. Chickpea grain yield followed a similar trend, with the maximum yield (2250.0 kg/ha) under R90+N1, which was significantly higher than all other treatments.

Phosphorus (P) fractionation under conservation agriculture-based soybean-wheat cropping system in a Vertisol

Soil samples collected from 0-10 cm and 10- 20 cm depth were analysed for P fractions in an ongoing field experiment, consisted of four levels of crop residue (CR) retention with zero tillage practices (CR0% CR30%, CR60% and C90%) along with a conventional tillage without residue treatment (CT). Across the treatments, the P fractions followed the order of Ca-P> Fe-P> Al -P> reductant soluble P> loosely held P. Among the residue treatments, CR0% showed significantly lower in all the fractions of inorganic P; whereas, CR90% recorded higher concentrations of Inorganic-P fractions. Zero tillage with or without residue retention maintained higher inorganic P fractions than CT.

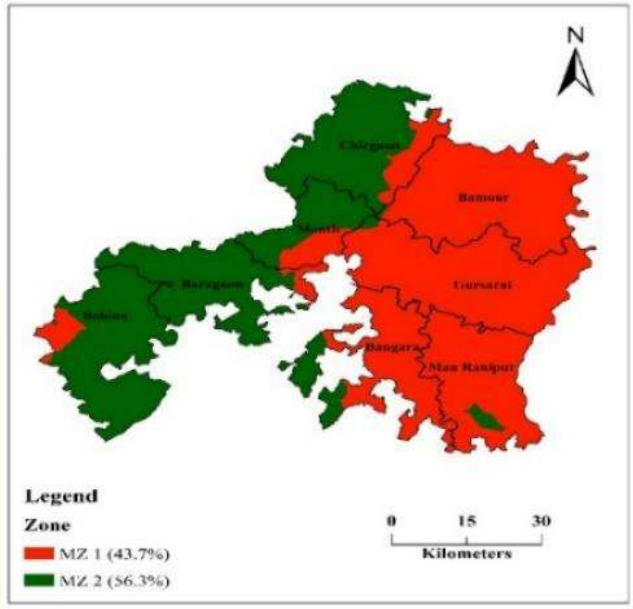
Evaluation of wheat genotypes for physiological and nutrient use efficiency under nutrient stress

Twenty-four wheat genotypes were evaluated for crop physiological and nutrient use efficiency attributes under nutrient gradient plots with low N (50% N), low P (50% P) and general recommended dose (100%NPK) of fertilizer nutrient (120-60-40 kg/ha of NPK) under field conditions. Among the physiological traits, the electron transfer rate (ETR) during light reaction of photosynthesis ranged from 150 to 300 μM electron m^{-2} s^{-1}, while photosystem II yield ranged from 0.68 to 0.76. Under 50% N conditions, genotypes HI 8737, HI 1563, HI 1605, HI 1531, HI 8498, and Narmada 14 produced grain yield greater than 4 t/ha. Ten genotypes showed more than 30% and 50% agronomic use efficiency for applied N under recommended N and low N dose conditions, respectively. Genotypes HI 1605, HI 1531, HI 8498 and DBW 88 exhibited N use efficiencies more than 50 kg grain per kg of applied N.



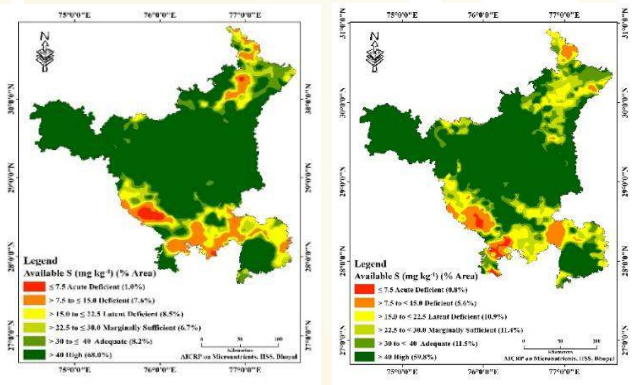
Delineation of soil nutrient management zone for site-specific sulphur and micronutrient management in Jhansi, India

Spatial distribution patterns of soil properties, available sulphur (AS), and key micronutrients (Zn, Fe, Cu, Mn, B) was studied to delineate nutrient management zones in the agricultural soils of Jhansi district, U.P. Using a stratified random sampling approach, 510 georeferenced surface soil samples were collected and analysed for various parameters. Soil pH ranged from 6.15–9.12, EC from 0.10–0.46 dS m^{-1}, and SOC from 0.10–1.18%. AS and micronutrients exhibited high variability, with coefficients of variation between 34.5% and 62.6%. Geostatistical analysis identified exponential models as best fitting, with weak to strong spatial dependence. Principal component analysis reduced the dataset to two significant components explaining 48.9% of the variance. Clustering analysis (2–9 clusters) ultimately delineated two distinct nutrient management zones with significantly different soil characteristics.

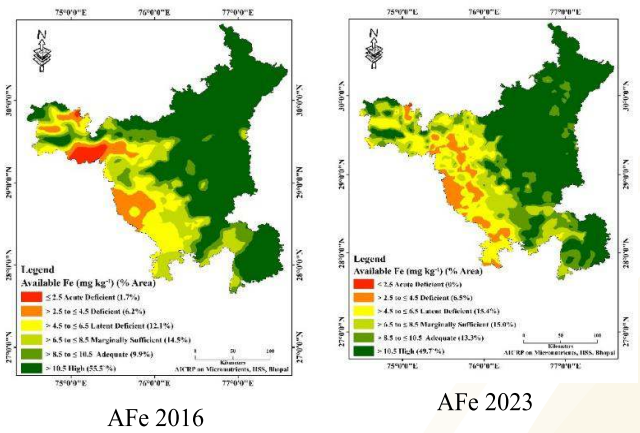


Spatio-temporal variability of soil fertility parameters of Haryana, India

Temporal changes (2016–2023) in soil pH, EC, SOC, and plant-available nutrients (S, Zn, Mn, Fe, Cu, and B) in cultivated soils of Haryana, India were evaluated. The soil fertility parameters exhibited wide variability, with coefficients of variation ranging from 6.22% (pH) to 127% (EC). Significant declines were observed in EC (0.50 to 0.39 dS m^{-1}), available S (83.4 to 65.9 mg kg^{-1}), Zn (1.99 to 1.56 mg kg^{-1}), Fe (12.6 to 11.0 mg kg^{-1}), and Mn (11.6 to 9.14 mg kg^{-1}) over the study period. Spatial dependence ranged from weak to strong, with exponential, Gaussian, and stable models best fitting spatial distribution patterns. Low-concentration zones of S, Zn, Fe and Mn expanded over time, highlights the need for continuous soil monitoring to support area-specific precision nutrient management strategies (ASPNMS) in cultivated regions.



AS 2016 AS 2023



AFe 2016 AFe 2023

Spatial distribution maps of Available S (AS) and Available Fe (AFe) in 2016 and 2023

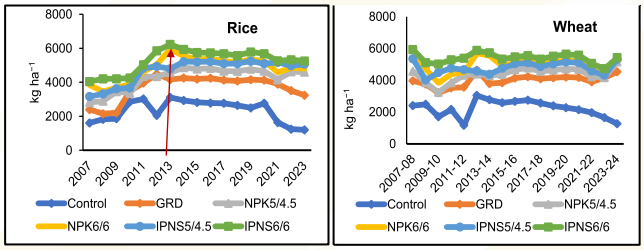
Integrated plant nutrient supply modules for sustainable productivity in Vertisols

A long-term study evaluated soil test–based fertilizer application for target yields of 5/4.5 t ha^{-1} (rice/wheat) and 6/6 t ha^{-1}, with and without organics, on crop yield, sustainability, and K balance. The results showed that soil test–based nutrient application produced more stable and sustainable yields. All treatments exhibited a negative K balance, indicating continuous K depletion. Although integration of fertilizers with organics enhanced yields and soil K-supplying capacity, it was still inadequate to achieve a positive K balance.

Development of prescription equation based on soil test crop response correlation

Crop (Variety)	
Fababeans (Vikrant HFB-1)	FN = 1.62 T – 0.13 SN FP_2O_5 = 2.07 T – 0.79 SP FK_2O = 1.92 T – 0.20 SK
Rice (CG Dhan -1919)	FN= 4.72 T – 0.70 SN – 0.25 ON FP_2O_5 = 1.22 T – 2.72 SP – 0.20 OP FK_2O = 1.37 T – 0.09 SK – 0.06 OK
Wheat (var. Kanishka)	FN = 7.18 T – 0.39 SN – 0.27 ON F P_2O_5 = 2.29 T – 2.40 SP – 0.12 OP FK_2O = 2.42 T – 0.07 SK – 0.10 OK
Capsicum (Sweet pepper)	*For chemical mode* FN = 1.12 T - 0.42 SN FP_2O_5 = 0.64 T - 3.97 SP FK_2O = 0.57 T – 0.14 SK *For IPNS mode* FN = 1.00 T – 0.38 SN – 1.81 ON FP_2O_5 = 0.59 T – 3.68 SP – 0.66 OP FK_2O = 0.55 T – 0.13 SK – 0.64 OK
Wheat (UP 2855)	FN = 3.30 T-0.43 SN FP_2O_5 = 2.68 T-2.25 SP FK_2O = 1.66 T- 0.21 SK

* *Where, FN, FP_2O_5 and FK_2O are the fertilizer doses (N, P_2O_5 & K_2O) 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}.*



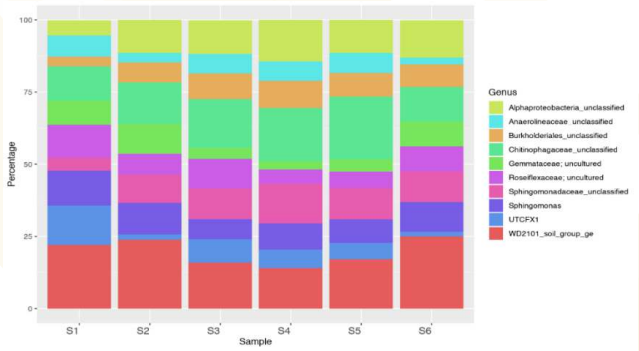
Rice and wheat grain yields (kg/ha) and trends in different fertilization treatments over 17-year period from 2007 to 2024. Arrow indicates change of target yield of rice.

Impact of tillage and N application on water balance and soil surface temperature in maize-based cropping systems in Vertisols of Central India

A study was conducted to evaluate the field water balance and soil surface temperature in a winter maize-wheat cropping system under projected future climatic scenarios (RCP 4.5 and 8.5) with 100% N application under no tillage (NT) and conventional tillage (CT) conditions in Vertisols of Central India. The Soil–Water–Atmosphere–Plant (SWAP) model was used to stimulate field water dynamics and optimize agricultural water management strategies for climate change mitigation. The model was calibrated and validated using field experimental data on soil water content and temperature with root means square error (RMSE) values of 1.09 for soil temperature and 0.32 for water balance up to 10 cm soil depth. Model based field water balance showed reasonable accuracy under different climatic situation. The results indicated that the soil profile moisture under no-tillage is comparatively higher than the CT.

Metagenome comparison of rhizosphere microbiome in a long-term jute-rice-wheat system in Inceptisols of Barrackpore

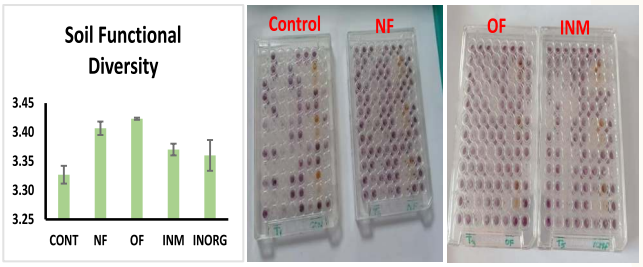
A long-term field experiment in the Inceptisols of Barrackpore evaluated rhizospheric microbiome profiles under different nutrient management practices in a jute–rice–wheat system. Application of FYM increased microbial load but reduced microbial diversity (~200 genera), whereas the control exhibited lower microbial load but relatively stable diversity. The dominant phyla included Acidobacteriota, Bacteroidota, Chloroflexi, Firmicutes, Myxococcota, Patescibacteria, Planctomycetota, Proteobacteria, and Verrucomicrobia. Several beneficial plant growth-promoting and biocontrol genera, linked to carbon sequestration and nutrient mineralization, were identified. Continuous use of 100% NPK for 10 years significantly reduced microbial diversity (~160 genera). Overall, integrated nutrient management (INM) better sustained microbial diversity than imbalanced nutrient applications.



Barplot showing top ten genus based on normalized OTU abundance

Enhanced functional diversity of soil microbes under organic based nutrient management

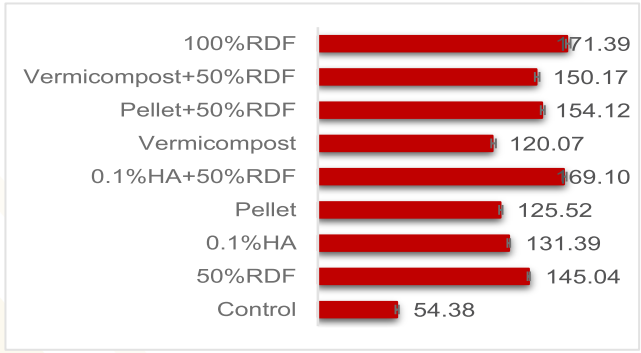
Functional diversity of soil microbial communities was assessed using community level physiological profiling based on carbon utilization pattern using Biolog EcoPlates™. The Shannon diversity index, calculated based on utilization of 31 carbon sources was highest under organic farming (3.42) and natural farming (3.41) system compared to other treatments. Organic farming soils showed highest utilization of carbohydrates, whereas natural farming soils exhibited higher utilization of polymers. In contrast, conventional, integrated nutrient management and inorganic treatments showed more utilization of amino acids.

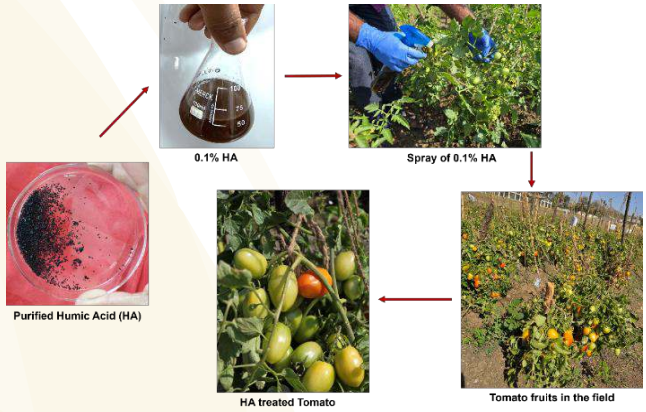


Shannon index for functional diversity under different nutrient management practices (CONT: control; NF: Natural farming; OF: Organic farming; INM: Integrated Nutrient Management; INORG (Inorganic nutrient management)

Effect of vermicompost-derived humic acid on tomato (*Lycopersicon esculentum*) growth and yield

The effect of vermicompost-derived humic acid on the growth and yield of tomato (var. IVTMH-101) was evaluated. The highest yield was recorded under 100%RDF (180:90:60 kg/ha) treatment. However, foliar application of 0.1% vermicompost derived humic acid (two sprays) combined with 50%RDF produced yields statistically at par with the 100% RDF treatment, indicating the potential to reduce fertilizer use without yield penalty.





Effect of vermicompost-derived humic acid application on tomato yield (kg)

Evaluation of microbial inoculants for alleviating moisture stress under wheat crop

Wheat seed (HD 1544) was treated with microbial inoculants pre-tested for moisture stress under laboratory condition. Four individual microbial cultures along with consortium were evaluated under field conditions. Moisture stress was imposed by skipping one irrigation in comparison to full irrigation as per standard practice. The inoculation of microbial culture isolated from organic and natural farming system showed greater potential for enhancing plant growth and crop productivity under moisture stress conditions.

In-*situ* decomposition of crop residue by lignocellulolytic microbes and its effect on soil properties under rice-wheat cropping system

Residue management treatments showed no significant effect on rice yield; however, application of microbial consortia with or without urea application positively influenced wheat yield. The residue management treatments did not significantly affect soil pH, EC, organic carbon, mineralizable N, available P and dehydrogenase activity. In contrast, available K, Fluorescein diacetate activity and phosphatase activity exhibited significant variation due to application of microbial consortia with or without urea application. These results suggest that in-situ residue decomposition using lignocellulolytic microbes can enhance certain soil biological and nutrient parameters, thereby supporting soil health in the rice-wheat system.

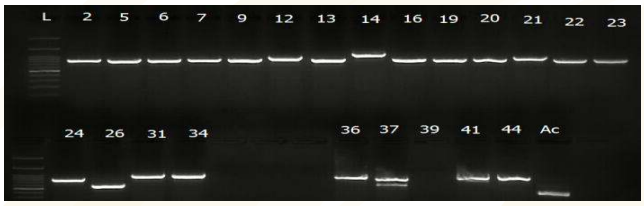
Effect of residue management treatments on soil K status, FDA and phosphatase activity

	Available K (Kg/ha)	FDA (μg Fluorescein /g/ hr)	Phosphatase (μ PNP/g soil/hr)
T1 (Residue incorporation)	660 b	22.4 abc	259 a
T2 (Microbial consortia application on residue + incorporation)	709 a	26.8 a	261 a
T3 (Microbial consortia application on residue + urea spray + incorporation)	710 a	24.6 ab	266 a
T4 (Residue removal)	636 b	18.6 c	228 b
T5 (Residue Burning)	680 ab	19.7 bc	245 ab
T6 (Residue incorporation)	677 ab	21.8 abc	266 a

Treatments with same letters are not significantly different at $p<0.05$.

Co_2 fixing rhizobia enhance nodulation and plant growth in pigeon pea

Rhizobia are symbiotic N_2 fixers and are heterotrophic in nature but often fails to establish effective nodulation particularly due to low soil organic carbon. To explore this , 48 rhizobial strains were isolated from pigeon pea nodules and rhizosphere soils. Among them, 23 strains carried the CO_2-fixing gene cbbL, which encodes the large subunit of RuBisCO, a key enzyme in CO_2 assimilation. Under controlled growth chamber conditions using pigeon pea variety 'Asha', inoculation with cbbL-positive strains significantly increased nodule number (19%), nodule mass (21%), and shoot dry weight (16%) compared to uninoculated controls. These findings suggest that CO_2-fixing rhizobia may offer ecological and agronomic advantages under carbon-limited conditions, and hold promise for the development of climate-resilient, more effective biofertilizer formulations.



Gel electrophoresis of PCR amplicon of cbbL gene.
L – Ladder. Bands exhibit occurrence of cbbL gene in nitrogen fixing rhizobia strains isolated from pigeon pea.

Impact of silicon solubilizing bacteria (SSB) on rice productivity in Vertisols of Central India

The effect of phosphorus solubilizing bacteria (PSB) and silicon solubilizing bacteria (SSB) on crop productivity under rice-wheat cropping systems were evaluated in Vertisols of Central India. Seven treatments were tested: control (T0), 75% RDF (T1), 100 % RDF (T2), 75% RDF + PSB-4 (T3), 75% RDF +PSB-5 (T4), 75% RDF + SSB- 3 (T5) and 75% RDF + SSB-4 (T6) with three replications. For the 2024 rice crop (PB-1), the highest grain yield was recorded in 75%RDF + PSB-4, while the control had the lowest yield. The yield improvement over 75 % RDF followed the order: 75%RDF + PSB-4 (25%) > 75% RDF + SSB-4 (23%) > 75%RDF +PSB-5 (13%)> 75% RDF + SSB-3 (9.6%)> 100 % RDF (8.8%). The study demonstrated that the application of Si and P as SSB and PSB significantly benefits the rice growth and productivity in Central India's Vertisols.

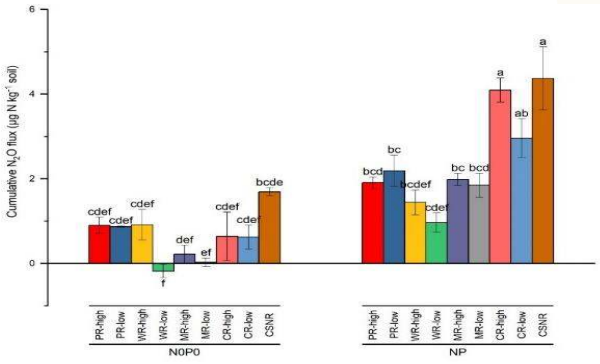
Bioprospecting of novel silica solubilizing bacteria as bioinoculants for sustainable silica management

Under the All-India Network Project at MPUAT Udaipur, the diversity and plant growth-promoting traits of silicon-solubilizing bacteria were assessed . From 88 rhizobacterial isolates, 24 effective Si-solubilizing strains (SiS-RB) were identified, exhibiting solubilizing indices of 1.05–3.40 cm and releasing 1.29–43.29 ppm silica. All isolates exhibited key growth-promoting traits. Six isolates (SSB-2, SSB-8, SSB-11, SSB-12, SSB-21, SSB-24) also solubilized minerals such as biotite, feldspar, and muscovite, enhanced maize growth in vitro, and boosted antioxidant enzymes (CAT, SOD, POD, PPO, PAL). ARDRA analysis revealed high genetic variability

(similarity 0.11–0.90), and 16S rDNA sequencing identified them as Enterobacter sp., Serratia surfactantfaciens, and Klebsiella sp. These Si-solubilizing rhizobacteria show strong potential for developing Si-based biofertilizers for Si-deficient soils.

Effect of crop residue quality on nitrogen transformation (mineralization and denitrification) in Vertisols

An incubation study on a Vertisol from Bhopal assessed the effects of residue type and quality on nitrogen mineralization and denitrification under nutrient-amended and non-amended conditions. Four residues(wheat, chickpea, maize, and paddy), each with two C:N levels, along with a no-residue control, were evaluated. Low C:N residues with nutrient (NP) addition increased NH_4-N by 18–22%, with chickpea residue (48:1) showing the highest value followed by maize (45:1). High C:N residues without nutrients reduced NH_4-N by 19–25%, whereas; nutrient -amended soil showed a strong NH_4-N increase by 21.8%. Nitrate-N was highest in NP-treated chickpea and maize, while high C:N wheat residue severely suppressed nitrate-N. NP application significantly increased N_2O emissions, especially in chickpea and the control soil, whereas low C:N wheat residue with NP showed minimal N_2O release.



Degradation of agri-plastic additive in a Vertisols of Central India

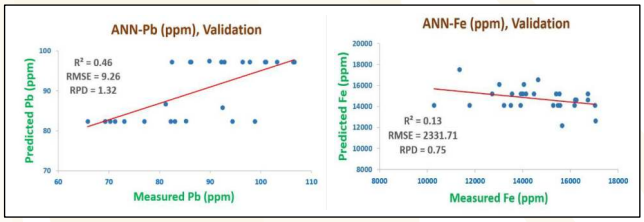
Degradation of two common agricultural plastic additives, 2-hydroxy 4-n-octyloxybenzophenone (BP-12) and tris (2,4-di-tert-butylphenyl) phosphite (AO-168)) in soil (Vertisols) was assessed for 21 days incubation period. BP-12 degraded rapidly following first-order kinetics with half-life ranging from 1 to 22 days. Degradation of BP-12 was positively correlated with soil microbial biomass and was higher in low pH soils. In contrast, AO-168 degraded occurred primarily through abiotic pathways and showed no correlation with soil properties. The results indicate that differential persistence and potential ecological risks of plastic additives in soil environment.

Novel method for minimizing selected heavy metals from MSW and production of quality MSW compost

Municipal solid waste (MSW) compost samples from Indore and Sagar districts were analyzed for the heavy metal concentrations across different size fractions (2, 1, 0.5, 0.25, 0.125, and 0.075 mm). Concentrations of Pb, Cd, Ni, and Cr consistently increased with decreasing particle size. In Indore compost, Pb ranged from 169.8 to 256.54 mg/kg, Cd 15.6–18.6 mg/kg, Ni 27.68–54.62 mg/kg, and Cr 48.23–73.64 mg/kg. Sagar compost showed the same pattern, with Pb at 100.8–135.6 mg/kg, Cd 9.11–17.5 mg/kg, Ni 36.17–47.33 mg/kg, and Cr 53.21–65.87 mg/kg. The finest fraction (0.075 mm) consistently accumulated the highest heavy metal concentrations, highlighting the need for size-based compost refinement to improve compost quality.

Machine learning algorithms used for the assessment of soil heavy metals of Jajmau industrial area, Kanpur

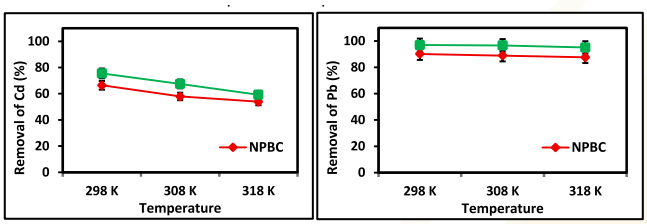
Partial Least Square Regression (PLSR) and Artificial Neural Network (ANN) model were developed to rapidly assess the lead and iron content (ppm) in contaminated soil of Jajmau, Kanpur, using visible–near infrared (VNIR) spectroscopy. The model were evaluated with the independent dataset using statistical criteria such as the ratio of performance of deviation, coefficient of determination (R^2) and root mean square error (RMSE).The ANN model was found best fit compared to PLSR for lead with R^2 (0.46) and RMSE (9.26) values for validation; whereas, for iron both the models showed poor performance due to low data variability.



Effects of temperature on the adsorption of Pb (II) and Cd (II) by nitrogen-purged and hydrothermally activated biochar

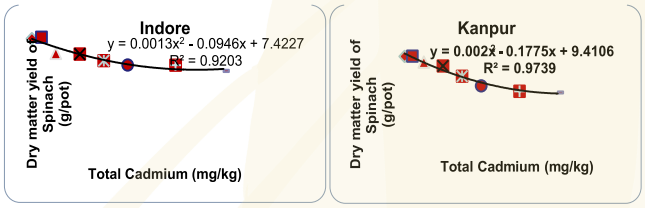
The influence of solution temperature on Pb (II) and Cd (II) adsorption from wastewater was evaluated using nitrogen-purged wheat straw biochar (NPBC) and hydrothermally activated biochar (SABC). Adsorption experiments were

conducted at temperatures ranging from 298 to 318 K at pH 5.0 ± 0.2. Both biochars showed higher Pb(II) adsorption at lower temperatures, while SABC exhibited superior Cd(II) adsorption (75.5%) compared to NPBC (66.4%). Reduced adsorption at higher temperatures was attributed to weakened electrostatic interactions and enhanced desorption.



Ageing effect of spiked cadmium on bioavailability of cadmium in soil and its phytotoxicity to spinach crop

Cadmium was spiked with graded levels ranging from 0 to 40 mg/kg soil in alluvial soil, black soil and lateritic soil. After 5 years, plant and soil samples were analyzed for cadmium content. Cadmium bioavailability and phytotoxicity remained largely unchanged in Alfisols over three years but declined markedly in Vertisols by the third year. In alluvial soils, a slight reduction in cadmium bioavailability and phytotoxicity was observed by the fifth year. These results demonstrate strong soil-type-dependent ageing effects of cadmium on its bioavailability and plant toxicity.



Effect of cadmium levels on dry matter yield of spinach leaf

EXTENSION ACTIVITIES

Activities conducted under Swachhata Action Plan (SAP)

Multiple training programs were conducted under the Swachhata Campaign across villages, engaging farmers and local communities between 26 July to 11 November, 2024. The sessions promoted eliminating open defecation and adopting sustainable crop residue management without burning. Overall, 389 participants were benefitted over different training programs (14 in number) held in this period.

Worm mother culture multiplication and distribution

Worm mother culture distribution programs were organised at farmers' field in Rasuliya Pathar, Ratibad, Kalakhedi and Ratanpure villages. In these programs 90 kg worm mother culture was distributed to the beneficiary farmers with all precautionary instructions and new vermi-bed units were installed in adopted villages.

Swachhata awareness campaign

Swachhata awareness campaigns were organized at adopted villages, about 1030 farmers/students participated in these programs in different villages from 28 September to 31 December, 2024. Farmers were made aware about harmful effects of crop residue burning on soil health, ways to manage crop residues through vermicomposting and microbial decomposer, importance of sanitation in farms, villages and surroundings. Awareness was also created on the importance of cleanliness, household waste segregation, and using separate bins for wet and dry waste. Special programs like Swachhata Awareness Day; training program on "Converting waste to wealth" and "Safe disposal of all kinds of waste"; fostering healthy competition on the occasion of Swachhta Pakhwada; essay, drawing, and swachhata quiz competition for school children; cultural fest etc. were organized during this period as part of the date-wise action plan for "Swachhta Hi Sewa".

Demonstration of nutrient management technology in the farmer's field

Under the SCSP project, demonstration of balanced use of fertilizers and integrated nutrient management in soybean and maize crops during Kharif season 2024. A total of 12 farmers were selected for soybean and 5 for maize cultivation, and inputs such as live soybean seed and fertilizers were distributed to 84 farmers. During the rabi season (Oct 2024–March 2025), 17 demonstrations on balanced fertilization and integrated nutrient management were conducted on wheat and chickpea under SCSP at farmers' fields in Agaria, Chapar, Magalia Kot, and Jagdishpur villages.

Drone demonstration

A field-day demonstration of pesticide application through drones was demonstrated on 16th August 2024 amongst the farmers of Mommanpur. Demonstrated the drone technology to the SIAET trainee (State department extension officials) on 18 September, 2024.

Input distribution and awareness program

Under SCSP activity successfully distributed vermicompost to 100 SCSP farmers of adopted villages (Ratatal, Nipaniya Sukha, Kardai, Chanderi, Jagdishpur, Mugaliyakot, Chhapar, Agariya) on 09,15 and 18 July, 2024.

ICAR-IISS, Bhopal organized a training cum agricultural inputs distribution programme at KVK Barwani (M.P.) on 09-10 November, 2024 for tribal farmers of Barwani district of Madhya Pradesh.

Seed packets of 12.6 quintals of chickpea and 70 kg of cowpea were distributed to tribal farmers of Rajnandgaon district, Chhattisgarh, during 11-12 November 2024 to improve the seed replacement ratio with high yielding chickpea and cow pea varieties and balanced nutrient management for maintaining soil health.

PROGRAMME/TRAINING/WORKSHOPS/SEMINAR/ MEETING ORGANISED

Independence Day

ICAR-IIISS, Bhopal celebrated 78th Independence Day on 15 August, 2024 with full zeal and enthusiasm.

World Soil Day

ICAR-IISS, Bhopal celebrated “World Soil Day” on 5 December, 2024 with the theme “Caring the Soils: Measure, Monitor and Manage.” The Institute also observed “Agriculture Education Day”, conducting essay and drawing competitions to promote soil health awareness among school children, along with a public awareness march-past. Padma Shri and World Food Prize laureate Dr. Rattan Lal, the Chief Guest, emphasized the importance of healthy soils and advocated regenerative agriculture and responsible fertilizer and pesticide use. The Director highlighted the “One Health” concept, underscoring soil as the foundation of life and the need to restore soil health. The event saw participation from 200–250 scientists, students, and farmers.

International conference on "Regenerative agriculture for improving soil health, enhancing carbon sequestration, and building climate resilience"

An International Conference was held on 6 December 2024 on “Regenerative Agriculture for Improving Soil Health, Enhancing Carbon Sequestration, and Building Climate Resilience.” The chief guest, DDG (NRM) ICAR, highlighted ICAR's efforts to advance regenerative agriculture. Prof. Rattan Lal delivered the keynote address. The conference featured thematic presentations on regenerative agriculture, soil health management innovations, and global approaches to carbon, climate, and sustainable supply chains. Five panel discussions were conducted, and the event was attended by ICAR directors and scientists, state officials, university researchers, NGOs, CSOs, students, and progressive farmers.

Kisan Diwas (Farmer's field Day)

ICAR-IISS, Bhopal organized “Kisan Diwas” (Farmer's field Day) on the occasion of national farmers day at Rasuliya Pathar, Bhopal, Madhya Pradesh on 23 December, 2024. In this program, farmers from Rasuliya Pathar, Taraisewaniya, Ratibad, Ratanpur, and Kalakedi, and Scientists from IISS, Bhopal participated.

World Environment Day and Plantation Drive

ICAR-IISS, Bhopal organized World Environment Day on 5 June, 2024 and a plantation event on 29th August 2024 as a part of the global campaign “**एक पेड़ मां के नाम**” (Plant 4 Mother), launched on “World Environment Day, 2024” at ICAR-IISS, Bhopal.

Agri Education Day

ICAR-IISS, Bhopal organized "Agri Education Day" on 3rd December, 2024 with the active participation of students of Navodaya Vidyalaya Parwaliya, Sardar Patel CM Rise School, Bhopal and St. George School Bhopal.

Hindi Pakhwada

ICAR-IISS, Bhopal organized Hindi Pakhwada during 14-28 September 2024. The valedictory function was conducted on 16 October 2024. The Chief Guest was Prof. Khem Singh Dehariya, the Kulguru of Atal Bihari Vajpai Vishwavidyalaya, Bhopal.

Workshops Organized

- ICAR-IISS, Bhopal organized workshop on "Poly mulch in crop cultivation: pros and cons" sponsored by GCRF-UKRI, Govt. of UK on 27-28 November, 2024.
- ICAR-IISS, Bhopal organized a strategy workshop on "Microplastics Pollution: Strategies for Remediation in Sustainable Environmental Management" on 3rd December, 2024 at NAAS, New Delhi.

Trainings organized

- Drs R Elanchezhian, M Vassanda Coumar, Nisha Sahu, Narayan Lal and Dinesh Kumar Yadav conducted a workshop cum training on Soil Health and Plant Nutrient Management during 11-12 November, 2024 at KVK Surgi, Rajnandgaon district, Chhattisgarh.
- Dr BP Meena organized a 3 days training programme on "Crop Diversification and Soil Health Management" sponsored by office of the chief district agriculture officer Bargarh district, Govt. of Odisha during 30 September to 3 October, 2024 at ICAR- IISS, Bhopal
- Dr BP Meena organized a 5 days training programme on "Crop Diversification and Soil Health Management" for progressive farmers sponsored by office of the chief district agriculture officer, (DEBADATTA CLUB) Bargarh, Govt. of Odisha during 23 -27 December, 2024.
- Drs Jitendra Kumar, Abinash Das and Khushboo Rani conducted a training program cum input distribution programme for tribal farmers during 25 June, 27-29August, 9-10 November, 2024 under tribal sub plan project on "Enhancement of Soil Health and Livelihood of Tribals in Central India" at KVK, Barwani, Madhya Pradesh.

Institute Visit Programs

- Dr Asha Sahu as coordinator, organized one day visit for 25 agricultural input dealers under DAESI diploma sponsored by ATMA, Raisen on 12 July,2024 at ICAR-IISS, Bhopal.
- Dr Asha Sahu, Dr Sudeshna Bhattacharjya, and Dr Abinash Das coordinated the visit of 50 farmers and officers from ATMA, Shivpuri during 29 July -1August 2024 at ICAR-IISS, Bhopal.

- Dr J.K. Thakur organized one day training cum visit to RAEO on organic farming, composting and soil health on 13 September, 2024 at ICAR-IISS, Bhopal.
- Dr Khushboo Rani and team conducted student visit for Sagar B pharma student on 10 September,2024.
- Drs Asha Sahu, Nisha Sahu and Sudeshna Bhattacharjya coordinated visit of students from Sagar Public School, Gandhi Nagar and MSB Educational Institute, Bhopal on 20 September, 2024 at ICAR-IISS, Bhopal.
- Dr Asha Sahu, Nisha Sahu and Sudeshna Bhattacharjya as coordinator organized the Institute visit for students and teachers of MSB Educational Institute, Bhopal on 24 September, 2024.

- Drs Asha Sahu, Sudeshna Bhattacharjya, Khushboo Rani, Madhumonti Saha and Dinesh Kumar Yadav coordinated a student visit of Rajkiya Madhyamik Vidyalayas, Lalitpur, Uttar Pradesh on 18.12.2024 at ICAR-IISS, Bhopal.

- Drs Nisha Sahu and Khushboo Rani coordinated a visit of students and teachers from Sagar Public School, Gandhi Nagar, Bhopal on 13 December 2024.

- Dr Khushboo Rani and team organized visit of ICAR-IISS, Bhopal for 15 Biochemistry students of Motilal Vigyan Vishwavidayala, Bhopal on 23 December,2024.

- Dr Khushboo Rani and team organized and conducted visit of ICAR-IISS, Bhopal for students from RKDF university on 08 October,2024.
- Dr Khushboo Rani and team organized an educational tour of ICAR-IISS, Bhopal for B.Tech students of AAU on 30 December, 2024.

- Dr Khushboo Rani and team organized visit to ICAR-IISS, Bhopal for B.Sc students of JNCT professional university, Bhopal on 09 December,2024.
- Drs Dinesh Kumar Yadav, M Vassanda Coumar, Abhijit Sarkar and Madhumonti Saha coordinated student visit of the Graduate School, IARI to a Sewage Treatment Plant (STP) during 15 December, 2024.

AWARDS/HONORS/ RECOGNITIONS

- Dr SK Behera received Fellowship of Indian Society of Soil Science, New Delhi during Global Soils Conference – Caring soils beyond food security: Climate change mitigation and ecosystem services held at NASC Complex, New Delhi during 19-22 November, 2024.

- Dr R Elanchezhian acted as Invited Speaker at the National Conference of Plant Physiology organized by ISPP New Delhi and ICAR-CPCRI Kasaragod during 17-19 December 2024.

- Dr Narayan Lal was awarded Global Eminent Scientist Award for 2024 by VIJ Trust, Thirunindravur, TN, India.
- Dr Narayan Lal was awarded Best oral presentation on Agri-horti systems for soil health management during 6th International Conference in Hybrid Mode on Innovative and Current Advances in Agriculture & Allied Sciences (ICAAAS-2024) 15-20 July 2024 at Hanoi, Vietnam.
- Dr Narayan Lal was invited as External Expert for Conducting Viva-Voce test of students of M.Sc. Veg. Science/Fruit Science by Dr BR Ambedkar University of Social Sciences, Indore, State University, Government of MP on 23 September, 2024.
- Dr Jitendra Kumar delivered an invited lecture (online) as a speaker in 9th Edition of Global Congress on Plant Biology and Biotechnology (27-29 March, 2025).
- Dr Jitendra Kumar received best poster presentation award in Global Soils Conference 2024 during 19-22 November, 2024.
- Drs A Mandal and JK Thakur invited as an expert in Strategy workshop on "microplastics pollution: strategies for remediation in sustainable environmental management, organized by NAAS, New Delhi on 3rd December, 2024.
- Dr A Mandal selected as Councillor of the Society of Indian Society of Soil Science for the Biennium 2025-26.
- Dr A Mandal as member of External Advisory Board at the SYMBIOREM consortium meeting held virtually on 2 October 2024.
- Dr A Mandal invited for recording video for MOOC on "Importance of Soil ecology in soil fertility for NF composite soil health assessment methodology " on 20 August,2024 organized by MANAGE, Hyderabad.
- Dr A Mandal invited as speaker on natural farming to the Asia Tea Alliance (ATA) summit held at Hotel Taj Bengal, Kolkata, WB, India during 7th November, 2024 organized by Solidaridad Network Asia Limited.
- Dr Abinash Das acted as External question paper setter for different courses of B.Sc. (Ag) for RLBCAU, Jhansi and OUAT, Bhubaneswar.
- Dr Asha Sahu received Best Oral presentation award during International Conference on "Current Innovations and Technological Advances in Agriculture and Allied Sciences" (CITAAS-2024) during 29-31 August 2024 at GKU, Talwandi Sabo.
- Dr Asha Sahu invited as keynote speaker by SAGE University during Summer School 2024 on Innovative Technologies in Agriculture during 5 August,2024 to 16 August, 2024.
- Dr Asha Sahu was invited as an expert for a workshop on "Waste to Wealth" theme under Swachhta hi Sewa Programme, on 25 September,2024 organized by ICAR-Central Institute for Arid Horticulture, Rajasthan.
- Dr Tapan Adhikari admitted as a Fellow of ISSS at the Global Soils Conference and 88th Annual Convention of the Indian Society of Soil Science, held during 19-21November, 2024, at NASC Complex, New Delhi.

- Dr Sangeeta Lenka received the Indian Association of Soil and Water Conservationists Gold Medal Award.
- Dr Sangeeta Lenka served as the External examiner for conducting the Viva-voice examination of M.Sc. students at the Department of Soil Science and Agricultural Chemistry, OUAT, Bhubaneswar, from 21-22 October, 2024.
- Dr DK Yadav served as an external examiner to the Agriculture University, Kota, Rajasthan, during Academic Session 2023-24.
- Dr Sangeeta Lenka served as a panelist in the side event of the International Rice Research Institute on "Carbon credit methodologies for low methane emission from Paddy" at the Global Soils Conference, held in New Delhi, India, on 20 November, 2024, organized by Indian Society of Soil Science.
- Dr Sangeeta Lenka served as a panelist in the session "Regenerative agricultural practices/Techniques for soil health improvement" at the stakeholder consultation meeting organized by Solidaridad for the project "Promotion of Regenerative Agriculture Practices for a Food Secure and Climate Resilient Future in the EU-India Partnership" on 8 July, 2024 Bhopal, Madhya Pradesh.
- Dr M Vassanda Coumar, acted as a technical Assessor and assessment of CAB was performed as per NABL conformity protocol for the Jain Research and Development Irrigation System Limited, Jalgaon during 03-04, August, 2024; Bansal Calibration and Test Lab Private limited, Sahibabad during 26-27, October, 2024 and Krishna Digital Material Testing Laboratory, Bhopal during 21-22, December, 2024.
- Dr DK Yadav acted as a jury member for the evaluation of agricultural models presented by various college students during the 11th Bhopal Vigyan mela organized by the MP Council of Science & Technology, Bhopal, and Vigyan Bharati, held at Jamburi Maidan, Bhopal, from 27 – 30 December, 2024.

- Dr Tapan Adhikari delivered an Invited lecture entitled "Industrial waste and effluent in agriculture- A Way Forward", on 20th November, 2024 at the Global Soils Conference and 88th Annual Convention of the Indian Society of Soil Science, held during 19-21November, 2024, at NASC Complex, New Delhi.
- Drs Nishant Sinha, Monoranjan Mohanty, Pramod Jha, Dhiraj Kumar, Jitendra Kumar, Rahul Mishra, RH Wanjari, Prabhat Tripathi, Narendra Lenka and RS Chaudhary received Best Poster Presentation Award at the 88th Annual Convention of the Society at NASC Complex, New Delhi on 21 November, 2024.
- Dr Dhiraj Kumar received "Eminent Scientist Award" in International Conference Cum Expo (NAHEP) 2024 organized by Commerce and Industry Development Foundation, Eco Fast Agri Solution and Bharti Media and Events Pvt. Ltd held at ICAR-CIAE, Bhopal during 20-22 December, 2024.
- Drs Dhiraj Kumar, RH Wanjari, NK Sinha and Anil Nagwanshi received 1st Best Oral Presentation Award for the paper entitled "Long term effect of fertilizer and manure on soil quality and yield sustainability of maize-wheat cropping system in Inceptisols and Alfisols'. International Conference-cum-Expo (NAHEP), 2024 held at CIAE-Bhopal from 20-22 December, 2024.
- Dr Rahul Mishra received ISSS Best Doctoral Research Presentation Award for of his Ph.D. dissertation on "Risk assessment and mitigation of arsenic contaminated rice soils in Nadia district of West Bengal" held at the 88th Annual Convention of the Society on 21 November, 2024 at NASC Complex, New Delhi.

SCIENTIST PARTICIPATION IN TRAINING/SEMINAR /WORKSHOP

Name	Programme attended/Participated	Date
Drs K Bharati and Madhumonti Saha	Training programme on "Mission LiFE – LifeStyle for Environment" at Indian Institute of Forest Management, Bhopal	July 8 -11, 2024
Dr DK Yadav	Strategy Workshop on "Crop Protection Solutions: Group MRL and Minor Uses of Pesticides" organized by NAAS, New Delhi.	July 12, 2024
Dr Sangeeta Lenka	8th meeting of the ASIAN soil laboratory network (SEALNET) on hybrid mode from hosted by the Bureau of Soil and Water Management of the Philippines.	July 15-19, 2024
Dr Narayan Lal	6th International Conference in Hybrid Mode on Innovative and Current Advances in Agriculture & Allied Sciences (ICAAAS-2024) at Hanoi, Vietnam.	July 15-20, 2024
Drs RH Wanjari and Dhiraj Kumar	Workshop on 'Information System on Long Term Fertilizer Experiments (ISLTFE)' (Online)	July 18, 2024
Drs Khushboo Rani and Abinash Das	Online Training Programme on Multivariate Data Analysis using R organized by NAARM, Hyderabad	July 22-26, 2024
Dr Sangeeta Lenka	World Bank "Roundtable Discussion on Solving Air Pollution in the Indo-Gangetic Plains with experts on air quality management in India"	July 31, 2024
Drs Asit Mandal and JK Thakur	Roundtable Discussion on Solving Air Pollution in the Indo-Gangetic Plains at World Bank, organized by Regional Director for Sustainable Development, South Asia Region, New Delhi.	August 01, 2024
Dr Nisha Sahu	Online meeting on CSR 1 Registration details by Shri Nitin Khera, Head, Finance Division, Third Planet Foundation	August 02, 2024
Dr Nisha Sahu	1st International Conference on Emerging Technologies in Agriculture and Allied Sciences (ETAAS-2024) organized by Society for Agriculture, Allied Sciences & Technology (SAAST) Odisha, School of Agriculture, SR University, Warangal & Meadow Agriculture Pvt. Ltd., UP	August 10-11, 2024
Dr Nisha Sahu	Fifth Knowledge Series Webinar on "A Decade of Strategic CSR" by The School of Business Environment, Indian Institute of Corporate Affairs	August 12, 2024
Dr A Mandal	Microplastics' Removal from Environmental Matrices: Current Scenario, Challenges, & Future Perspectives at ICMR-NIREH, Bhopal	August 22-23, 2024
Dr Asha Sahu	International Conference on "Current Innovations and Technological Advances in Agriculture and Allied Sciences" (CITAAS-2024) jointly organized by Guru Kashi University, Talwandi Sabo (ICAR accredited) and Just Agriculture Education Group and ISASTR, Noida	August 29-31, 2024
Drs NK Sinha, JK Thakur, DK Yadav	Sustainable and Green Finance at IIFM, Bhopal	September 2-4, 2024
Drs M Vassanda Coumar and M Homeshwari Devi	7th International conference on "Advances in agriculture technology and Allied sciences (ICAATAS 2024)" organized by Society of Agriculture Research and Social Development (New Delhi), Southern Federal University (Russia) & The Neotia University	September 15-16, 2024
Drs Asha Sahu and Narayan Lal	Webinar on "Carbon Credits in Agriculture: Unravelling the Enigma" organized by the Centre of Excellence on Watershed Management, University of Agricultural Sciences, Bangalore under the World Bank supported REWARD programme.	September 19, 2024
Dr Tapan Adhikari	International Conference "Micro-2024" at Lanzarote, Spain and delivered lecture on "Potential impact of microplastic on plant (*Solanum melongena*) and microbial growth in a Vertisols of Central India".	September 23-27 2024
Dr Sangeeta Lenka	Editor's online workshop-Enabling A Research Ecosystem, at ICAR	September 24, 2024
Drs M Vassanda Coumar and Asha Sahu	The Global Symposium on Soil Information & Data (GSID24) (online) jointly organized by the Food and Agriculture Organization, its Global Soil Partnership and the Institute of Soil Science, Chinese Academy of Sciences (ISSCAS) at Nanjing, China	September 25-28, 2024
Drs Khushboo Rani and Abinash Das	Fourth Edition of International Conference "Plant Security and Food Safety: Microbiology, Soil Science, Food Quality and Agricultural Genetics" organized by Nicolaus Copernicus University, Torun (Virtual mode)	September 26-27, 2024
Dr Abinash Das	9th International Symposium of Interactions of Soil Minerals with Organic Components and Microorganisms (ISMOM) at Ibaraki, Tsukuba Japan	October 15 -18, 2024

Dr Nisha Sahu	Seventh Webinar delivered by Dr Sapna Gopalakrishnan Nair, Program Director Healthcare, Infosys Foundation on "Research grants by Infosys Foundation: some insights for future direction in CSR"	October 10, 2024
Dr Nisha Sahu	DST sponsored training on "Leadership Development Programme for Scientists" at Administrative Staff College of India (ASCI), Bella Vista, Hyderabad	October 14-18, 2024
Drs Narayan Lal	IP Awareness/Training program	October
Dr Khushboo Rani	under National Intellectual Property Awareness Mission organized by Intellectual Property Office, India Online IP Awareness Week organized by Intellectual property and technology management unit ICAR, New Delhi	18, 2024
Dr Nisha Sahu	Eighth Webinar delivered by Ms Tejashree Thatte, Associate Director Business Engagement & Impact Assessment, Give Grants on "Reflections from the last decade of CSR, envisioning for the next	November 8, 2024
Dr M Vassanda Coumar	Online Awareness Programmes on IPRs organized by IP&TM Unit, ICAR, New Delhi	November 12-19, 2024
All scientists	XXVIII RAC Meeting held at ICAR-IISS, Bhopal organized by ICAR	November 13-14, 2024
Drs SR Mohanty, SK Behera, Tapan Adhikari, Sangeeta Lenka, AK Tripathi, K Bharati, Asit Mandal, JK Thakur, Asha Sahu, Abinash Das Jitendra Kumar, Khushboo Rani, M Vassanda Coumar, Nisha Sahu, Abhijit Sarkar, Madhumonti Saha, Dinesh Kumar Yadav, RH Wanjari, Immanuel C Haokip, Rahul Mishra	Global Soils Conference – Caring soils beyond food security: Climate change mitigation and ecosystem services held at NASC Complex, New Delhi	November 19-22, 2024
All Scientists	International Conference: "Regenerative Agriculture for Improving Soil Health, Enhancing Carbon Sequestration, and Building Climate Resilience" on the occasion of World Soil Day organized by ICAR-IISS, Bhopal	December 6, 2024
Dr. Jitendra Kumar	Advanced International Course on Conservation and Regenerative Agriculture' in India. Course is jointly hosted by ICAR, CIMMYT and BISA.	December 3-23, 2024
All Scientists	Participated in One day workshop to "Observation of Sexual Harassment of Women at Workplace Prevention, Week" held at ICAR-IISS, Bhopal	December 11, 2024
Dr Dhiraj Kumar	Participated in National Seminar on "Digital Agriculture: Empowering Indian Farming" at NASC, New Delhi.	December 17-18, 2024
Dr R Elanchezhian	National Conference of Plant Physiology organized by ISPP at ICAR CPCRI Kasaragod	December 17-19, 2024
Dr Dhiraj Kumar	International Conference Cum Expo (NAHEP), 2024 held at CIAE-Bhopal.	December 20-22, 2024

STAFF NEWS

New Joining

1. Shri Deepak, Assistant joined the institute on 01 November, 2024
2. Ms. Aditi Agarwal, Scientist joined the institute on 05 December, 2024

Transfer

Shri Mahesh Kumar Mulani, SF&AO transferred to ICAR-Central Institute of Agriculture Engineering, Bhopal on 31 December, 2024

Retired

1. Shri Deepak Kaul, Chief Technical Officer retired from ICAR service on 30 November, 2024
2. Shri Sant Kumar Rai, Senior Technical Assistant retired from ICAR service on 30 November, 2024

Promoted

Shri Darash Ram Manjhi, Skilled Supporting Staff promoted to the post of Technician (T-1) on 04 October, 2024

Foreign Deputation

1. Dr. Siba Prasad Datta, Director, and Dr. Tapan Adhikari, Head, Division of ESS attended the second International meeting organized by Imperial College, Exhibition Rd, South Kensington, London, United Kingdom under International collaborative project entitled "Do Agricultural Micro Plastics Undermine Food Security and Sustainable Development in Less Economically Developed Countries" 03-04 July 2024
2. Dr. Rahul Mishra, Scientist attended the 8th meeting of the Asian Soil Laboratory Network (SEALNET), Quezon City, Phillippines at the Department of Agriculture-Bureau of Soil and Water Management (DA-BSWM) of the Philippines from 15-19 July, 2024
3. Dr. Asit Mandal, Senior Scientist and Dr. Jyoti Kumar Thakur, Senior Scientist attended advance training programme "To study microbial community analysis using metabarcoding techniques and plastic analysis" organized by Bangor University, Bangor, Gwynedd, UK from 22-26 July, 2024
4. Dr. Santosh Ranjan Mohanty, Head, Division of Soil Biology and Dr. Kollah Bharati, Principal Scientist visited University of Strasbourg, CNRS, Strasbourg, France under the Indo-French project entitled "Phyllosphere Methylotroph driven bioconversion of atmospheric greenhouse gas and volatiles to plant metabolites leveraging crop productivity and mitigation of climate change" from 18-24 September, 2024
5. Dr. Siba Prasad Datta, Director and Dr. Tapan Adhikari, Head, Division of ESS participated in "MICRO 2024: Plastic Pollution from macro to nano" in Arrecife, Lanzarote, Spain from 23-27 September, 2024
6. Dr. Abinash Das, Scientist attended 09th International Symposium of Interactions of Soil Minerals with Organic Components and Microorganisms (ISMOM-2024) at Tokyo, Japan 15-18 October, 2024
7. Dr. Nishant Kumar Sinha, Senior Scientist attended International Conference on Biodiversity, Agroforestry, Non-Wood Forest Products and Sustainable Livelihoods (ICBANS-2024) in Kota Kinabalu, Sabah, Malaysia from 18-19 October, 2024

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