



ICAR-IISS Newsletter



IISS

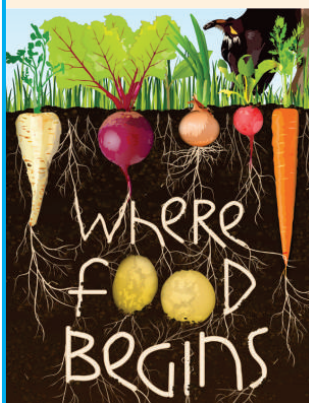
Volume 18, Number 2

July - December 2015

From the Director's Desk

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Healthy Soil for Sustaining Food and Human Security



Soil, the uppermost layer of the mantle of the earth has been formed over millions of year which helps in support and sustaining vast diversity of life. The stability of soil systems is controlled by their inherent balance between inputs and output of all the nutrients including carbon, the basic elemental building block required for life. Agricultural interventions in the past thousands of years, as a consequence of switch over from simple nomadic hunter gatherer life to intensive cultivation of land resulted in unprecedented exploitation of soil resources. In spite of achieving self-sufficiency in food grain production we need to produce more food from limited resources for more people. However, over the last four to five decades, the health of soil is declining at faster rate with higher rates of soil erosion, declining factor productivity and nutrient use efficiency, loss of soil biota and degradation of land due to environmental pollution. Additionally, agricultural practices have also greatly altered balances of major nutrients viz. carbon, nitrogen, phosphorus leading to climate change and environmental degradation of our ecosystem.

The 68th UN General Assembly has officially recognized the 2015 as the International Year of Soils (IYS). This has certainly generated greater awareness and attention about soils to the general public at a global scale, which needs to be sustained in long run for sustainable exploitation of our fragile and limited soil resources of our planet earth. Hence, the soil science has become one of the core agricultural sciences to care of soil resources for the posterity. Moreover, it is the diverse schools of physical, chemical, biological and environmental science, for which the ICAR-Indian Institute of Soil Science (ICAR-IISS) is striving for with renewed efforts in research and development leading to improved soil productivity with minimal environmental degradation over the last two and half decades. Of late there were rapid strides in empirical and theoretical understanding of soil processes leading to societal well-being. However there are greater challenges and opportunities exist with reference to maintaining the role of soil in food, climate change mitigation, and human security. The impending danger of dwindling fertilizer resources offers opportunities for novel partnerships to develop efficient methods of nutrient recycling and redistribution systems in present day scenario. Possibly the most challenging issues will be to improve the nutrient use efficiency of crops, better preservation of soil biota, in-depth understanding on the magnitude of global soil carbon cycle to climate change mitigation with minimal environmental losses. Hence, concerted efforts are not only required at national level but also at global level to sustain soil resources for food and human security.

In this endeavor, the present newsletter aimed to highlight the significant achievements of ICAR-IISS addressing above said issues. This newsletter encompasses results on the long term trend of maize – chickpea system productivity under integrated plant nutrient supply modules, evaluation of modified urea materials and impact study of nanoparticles based fertilizers on crop growth for improved nutrient use efficiency and enhanced crop yield. The study on the effect of conservation agricultural practices has emphasized its relevance in sustaining SOC and crop yield of maize, soybean, chickpea and wheat. Besides, preliminary assessment of soil properties of Vertisols using mid-infra red (MIR) spectroscopy has been done using prediction models, which will be validated in due course of time. Metagenomic diversity of microbes in the composting system have been analyzed. Bioremediation potential of cotton for heavy metals and microbial solubilization of P from rock phosphate was also evaluated. In commemoration of IYS 2015, several training cum awareness programs were organized during this period for students, farmers and development functionaries of state department at the institute as well as at various districts of M.P. with the theme “Sustainable soil health and INM for better crop productivity”. Several awards and honours have also been bestowed on the scientists of this Institute for their exemplary work during this period. With the productive six month period, the Institute would continue to put its best efforts to care and sustain soil resources for food and human security.


(Ashok K. Patra)
Director

Integrated plant nutrient supply modules for sustainable crop production under maize-chickpea cropping system

Integrated plant nutrient supply (IPNS) modules showed significant positive response of maize yield under maize-chickpea cropping system (fig. 1). Among the different IPNS modules, maize grain and stover yield were significantly increased with application of 75% NPK of STCR based dose with 5t farmyard manure (FYM) and followed by general recommended dose (GRD) and other FYM based integrated plant nutrient supply (IPNS) modules. Maize productivity was also increased with application of 75% NPK dose of STCR based fertilizer module with integration of different organic sources of nutrients viz., poultry manure and urban compost. Further results revealed that soil-test crop response equation (STCR) recommended dose of fertilizer and farmyard manure based different IPNS modules continued to perform better than any other module in maize productivity probably because of higher nutrient addition.



Fig. 1. INM field experiment at IISS research farm

Modified urea materials for enhancing nitrogen use efficiency and sustaining crop productivity

A field experiment was conducted to evaluate different modified urea materials for enhancing nitrogen use efficiency and sustaining crop productivity. Among different modified urea materials, neem coated urea (NCU) recorded significantly higher grain and stover yield of maize crop and NUE followed by biochar coated urea (BCU) and pine oleoresin coated urea (POR) over control. The increase in total dry matter yield over prilled urea might be due to slow release of N from the coated urea during crop growth period. The results also revealed that crop productivity were significantly higher in the treatments where basal dose of nitrogen was skipped and total N was applied in two equal splits (60 kg N/ha) at 20 and 40 days after sowing, respectively (Fig. 2).

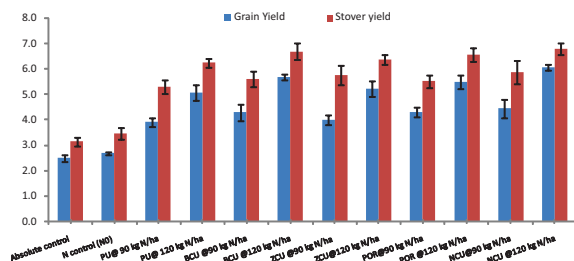


Fig.2. Effect of different modified urea materials on maize yield

Fe nanoparticles (Fe_3O_4) on maize growth and crop metabolism

The impact of Fe nano-micronutrient fertilization on growth and metabolism of maize was studied under hydroponic system (Fig

3). The nanoparticles analyzed through Transmission Electron Microscope (TEM) revealed that most of NPs were within 50 to 100 nm. Plants treated with optimal recommended dose of nano Fe ($54\mu M$) showed an increased morphological features viz. plant height, shoot biomass and root biomass. Further, antioxidant enzyme activity was significantly decreased in the plant fertilized with nano Fe as compared to the plants fertilized with the Fe in macro form (salts). However, sub optimal dosage of Fe ($27\mu M$) in nano form positively influenced leaf area and proline content of plants than Fe in macro form which considerably reduce the Fe dose and there by helps in improving the nutrient use efficiency in maize crop.

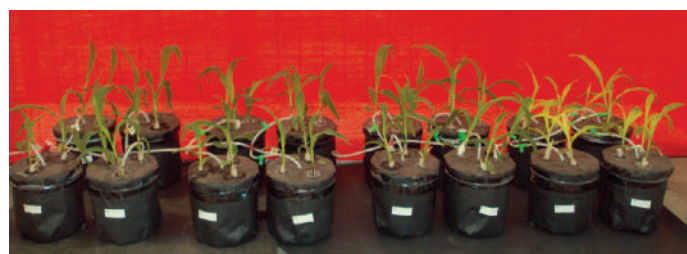


Fig.3. Impact of Fe NP on maize plant at 30 DAS

Effect of conservation agricultural practices on crop yield and soil properties

A study was conducted with two tillage treatments namely conventional tillage (CT) with residue removed and reduced tillage (RT) with residue retained under different cropping systems i) Soybean- Fallow, ii) Maize- Gram, iii) Soybean- FallowR (R: rotated with maize-gram), iv) Soybean + Pigeon pea (2:1), v) Soybean+ Cotton (2:1) and vi) Soybean- Wheat. Yield data indicated that tillage had a significant effect ($P < 0.05$) on soybean grain equivalent after completion of four crop cycles. This may be ascribed due to improved soil properties under minimum tillage operations (RT) coupled with residue retention (Fig 4.). Except soybean-fallow based systems, other cropping systems were significantly ($P < 0.05$) different from each other in terms of soybean Grain equivalent yield (SGEY). Irrespective of tillage system, maize-gram recorded significantly higher yield followed by soybean-wheat and soybean+ cotton (2:1). The interactive effect of tillage x cropping system showed non – significant effect ($P < 0.23$) on SGEY. After completion of four crop cycles, SOC data of four incremental soil depths (0-5, 5-15, 15-30 and 30-45cm) indicated that surface layer (0-5cm) registered relatively higher SOC concentration and decreased with increasing depth. In



Fig. 4. A View of Gram crop under reduced tillage

RESEARCH HIGHLIGHTS

surface layer, tillage and cropping system did not have significant effect on SOC, whereas in the subsurface layer (5-15cm) both tillage and cropping system had a significant effect on SOC concentration. This has attributed to incorporation of residue under reduced tillage.

Chickpea root architecture as influenced by soil compaction levels

Root systems of chickpea CVs JG-130 and JG-11 were assessed in response to different soil compaction levels in red soil under laboratory condition (Fig 5 a, b). Significant differences in the root architecture of both the cultivars were observed with increase in bulk density (BD) from 1.2 Mg m⁻³ to 1.6 Mg m⁻³. In both the cultivars, the number of primary roots and length of main axis decreased significantly with increase in soil compaction levels. Among the cultivars, the main axis length was greater in JG-130 than JG-11 at 1.2 and 1.4 Mg m⁻³ whereas, there was not much difference at 1.5 and 1.6 Mg m⁻³ BD levels. On an average, there was 29% and 32% reduction in number of primary root in JG-130 and JG-11 with increase in BD from 1.2 Mg m⁻³ to 1.6 Mg m⁻³, respectively. Results highlighted that soil compaction may negatively influence root architecture of chickpea wheat.

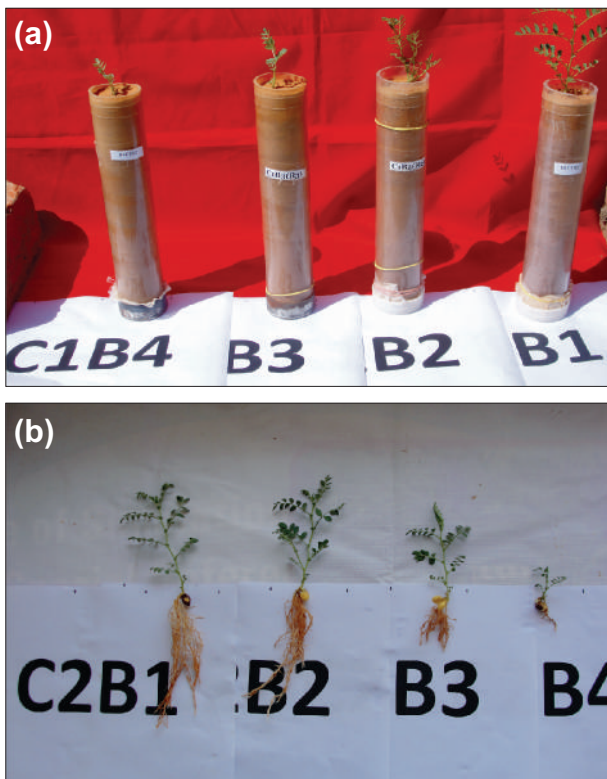


Fig. 5. Root growth of chickpea cultivar (a) JG-130 (b) JG-11, at different compaction level (B1= 1.2 Mg M⁻³, B2= 1.4 Mg M⁻³, B3= 1.5 Mg M⁻³ and B4= 1.6 Mg M⁻³).

Maize yield as influenced by temperature change scenario in the state of Madhya Pradesh

The results obtained from averaging 74 soil profiles comprising of 30 districts of Madhya Pradesh indicates that with increasing the temperature from base to 5°C, the maize grain yield decreased by

36.9%. On an average 1°C increase in temperature resulted in 0.3 t ha⁻¹ reduction in grain yield (Fig.6) and 0.4 t ha⁻¹ in total biomass yield.

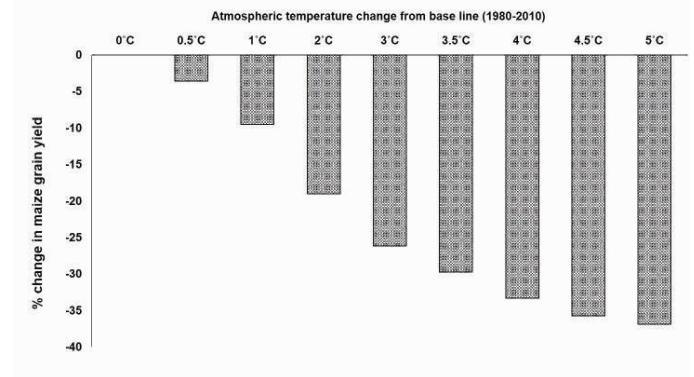


Fig. 6: Maize grain yield as influenced by temperature change in M.P.

Assessment of soil properties using Mid-Infrared Spectroscopy

Diffuse reflectance spectroscopy in the middle infrared provides a good alternative that may be used to enhance and support conventional methods of soil analysis. The mid-infrared spectra between 400 to 4000 cm⁻¹ wave number recorded using the FT-MIR spectrometer in the diffused reflectance mode of the soil samples after their mathematical pre-processing were used for

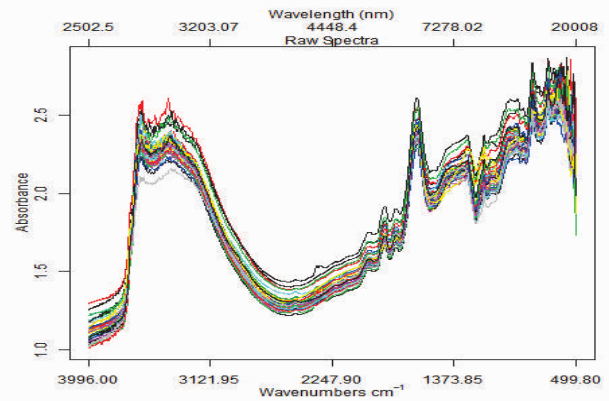


Fig. 7. MIR spectra of soil samples derivative

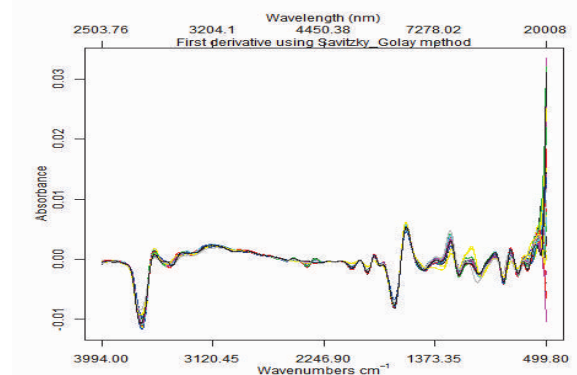


Fig. 8. Spectral signature after pre-treatment through first order

development of mathematical models for prediction of soil properties. Different spectra pre-treatment techniques like, multiple scatter correction, standard normal variate, standard normal variate-detrending, first and second order derivative, were tested for processing the raw MIR spectra. It was observed that the first order derivative manipulation of the spectral data greatly enhances some of the spectral features (Fig. 7 and 8) and the second derivative enhances them even more. Different prediction models of soil properties were then developed using partial least square (PLS) regression and random forest regression technique with the pre-processed MIR spectra and laboratory generated soil properties data and then cross validated. The preliminary study results indicated that the MIR spectroscopy could potentially be used for prediction of soil properties in Vertisols.

Metagenomic diversity of microbes in the composting system

In order to understand archaea community structure and abundance, cattle manure was composted in field-scale and composting materials were analyzed by culture independent molecular approaches. Terminal restriction fragment length polymorphism (TRFLP) of archaeal specific genes showed that archaeal community in compost was mainly consisted of methanogens and ammonia-oxidizing archaea (AOA). During early period of composting (0 -5 day of sampling), relative fluorescence of methanogens was high. Subsequently (~40 day) ammonia oxidizing archaea were predominated. The TRFs of AOA closely resembled with crenarchaeota and uncultured archaeons (Fig 9).

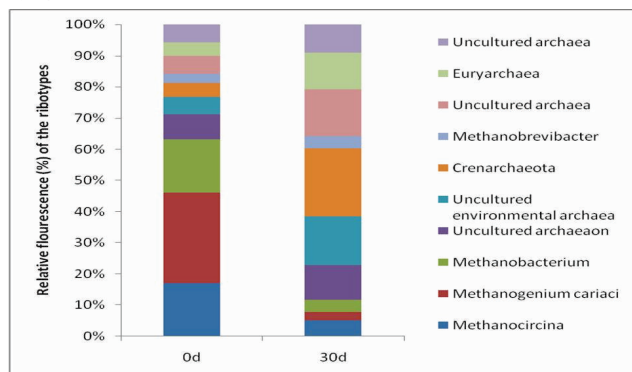


Fig. 9. Diversity of archaea in the cattle manure compost during initial and 40 days of composting.

Is ETP sludge safe for vegetables cultivation?

Sludge generated from effluent treatment plant (ETP) of industries has high potential for use in agriculture due to high contents of organic matter and plant nutrients. However, elevated levels of heavy metals are major concern as these may contaminate food chain. Screen house as well as field experiments were conducted to understand heavy metal contamination potential of ETP sludge to leafy vegetable crop spinach (*Spinacia oleracea*). ETP sludge generated from a soft-drink beverage company had high contents of organic matter (19 – 32% C) and plant nutrients (2.6-2.9% N, 2.3-2.7% P, 0.2-0.45% K). However, it also contained higher concentration of heavy metals like 108-117.6 mg/kg Cu, 42.2-49.1

mg/kg Cd, 677-770 mg/kg Pb, 92-154.3 mg/kg Cr, 26.9-34.9 mg/kg Ni, 935-1162.5 mg/kg Zn, and 9-9.85 mg/kg As. Among the heavy metal, Cd, Pb and Cr were more than the permissible limit for composts (FCO, 1985) for application in agricultural land.



Fig.10. Growth of spinach under different nutrient sources: RDF and ETP sludge

Baseline concentrations of heavy metals in Sehore and Vidisha districts

Understanding the current abundance and spatial distribution of metals in soils are essential and moreover reliable information on this aspect are urgently needed for proper legislation. To estimate the baseline concentrations and spatial distribution of heavy metals (HMs), about 100 surface soil samples (0-20 cm) were randomly collected in agricultural soils of Sehore and Vidisha districts. These samples were analyzed for physico-chemical properties and total HM contents. Most of the soils in the region had neutral to alkaline pH (6.58-8.60), non saline (EC 0.11-1.3 d Sm⁻¹), medium organic carbon (0.6%), CaCO₃ 0.2-11.5% and clay >40%. The baseline concentrations of HMs (mg kg⁻¹) were Cu 178.1, Cd 0.7, Pb 24.4, Cr 116.9, Ni 81.8 and Zn 85.2 mg kg⁻¹, respectively.

Carbon Sequestration through use of sewage water for crop production

Long-term use of untreated sewage water to crops results in significant increase in soil organic carbon (SOC) than soils irrigated with groundwater. Long-term untreated sewage water irrigation was found to increase SOC upto 60 cm of soil profile in the farmers' fields of peri-urban areas around Bhopal city (Fig. 11). Large addition of organic matter through sewage water irrigation and anaerobic conditions developed due to heavy loading of organic matter might have reduced organic carbon mineralization and thus resulted in build-up of SOC.

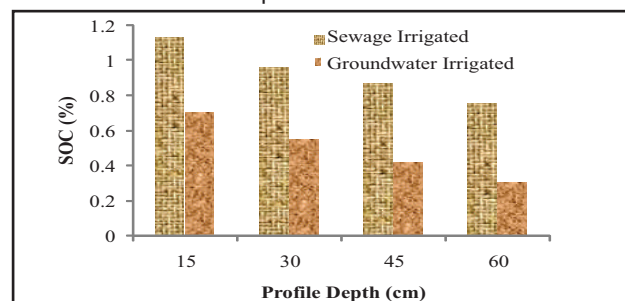


Fig. 11. Carbon build up in sewage water irrigated soil

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Impact of long term nutrient management on grain quality

Quality of produce under different nutrient supply system has always been a debatable issue. In this context, quality parameters of rice viz., protein, starch, carbohydrates, lysine and methionine were estimated. Results revealed that imbalanced use of nutrients (control, 100% N, 100% NP) resulted in decline of all the quality parameters compared to balanced use of nutrients. Additional application of FYM even though led to little improvement in the quality parameter but were at par with inorganic fertilizer (150% NPK). Moreover, balanced use of nutrient application resulted in improvement of grain quality compared to imbalanced use of nutrient. Absence of Zn had adverse effect on quality of wheat. However, additional supply of organic manure resulted in improvement in sedimentation rate and protein content in wheat grain. Thus, from the results it is evident that balanced use of nutrient along with organic manure is essential to maintain the quality of produce.

Awards/Honours/Recognitions

Dr S Lenka (Scientist) was awarded Endeavour Research Fellowship-2015 and successfully completed Post-Doctoral fellowship at Western Sydney University, Australia during April to September, 2015.

Dr. J. Somasundaram (Senior Scientist) was awarded Endeavour Research Fellowship-2015 and successfully completed Post-Doctoral fellowship at DSITI, Ecosciences Precinct (ESP), Dutton Park, Brisbane, Australia during May to October, 2015.

Dr. Tapan Adhikari, (Pr. Scientist) was awarded Endeavour Research Fellowship-2015 and successfully completed Post-Doctoral fellowship at University of Newcastle, Australia during Aug. 2015 to Feb. 2016.

Dr. M. L. Dotaniya (Scientist): Awarded Second Best Oral Paper Presentation by Search and Research Society held at Bhopal during 27th to 28th November, 2015.

Dr. Sanjay Srivastava (Principal Scientist): Elected as Councilor of the Indian Society of Soil Science for 2016-17.

R.H. Wanjari, (Sr Scientist) received the Outstanding Achievement Award GRISAAS 2015 in the discipline of Agronomy of the Astha Foundation, Meerut (UP).

Dr. D.L.N. Rao (PC-BF): Delivered an invited talk on "Biofertilizers-Current Scenario and Future" in the national dialogue on "Efficient Nutrient Management for Improving Soil Health" held at IARI, New Delhi during 28th to 29th September, 2015.

Dr. D.L.N. Rao (PC-BF): Delivered the 7th Professor S.K. Mukherjee Memorial Lecture on "Brave New Soil Science" in the National Seminar on "Soil Health Management and Food Security: Role of Soil Science Research and Education" held at Kolkata on October 8, 2015.

Dr. D.L.N. Rao (PC-BF): Delivered a special lecture on "Bright New Horizons in Soil Science" to school students in IYS celebrations of IISS at Regional Science Centre, Bhopal and at IISS, Bhopal on November 18 and 19, 2015 respectively.

Dr. D.L.N. Rao (PC-BF): Delivered a special lecture on "Soil Biology and Microbial Diversity -New Paradigms" during IYS celebrations of ICAR on November 24, 2015 at NAAS, New Delhi.

Dr A.K. Biswas conducted Ph.D. viva-voce exam of Trisha Roy at IARI, New Delhi on December 29, 2015.

Dr. M. Vassanda Coumar (Scientist): Delivered invited lecture on "Application of radioisotopes in soil testing and plant nutrition studies in the National seminar on "Application of radioisotopes and radiation technology in industries, agriculture, healthcare and its impact on environmental" held at AISECT University, Bhopal during 3-4 July, 2015.

International cooperation

A new project for establishment of virtual joint centres in Agricultural Nitrogen (IUNFC- Indian-UK on nitrogen fixation centre) is being proposed under grant from BBSRC (UK) and DBT (India) Newton Bhabha fund.

Extension Activities

Kisan Mahasammelan and Soil Health Card Distribution Program on World Soil Day

The World Soil Day was celebrated on 5 December, 2015 at the ICAR- Indian Institute of Soil Science, Nabibagh, Bhopal with a Kisan Mahasammelan and Soil Health Card Distribution Ceremony, which was graced by the Hon'ble Chief Minister of Madhya Pradesh, Shri Shivraj Singh Chouhan Ji. Among other dignitaries were Shri Gauri Shankar Bisen, Hon'ble Minister of Agriculture, Government of Madhya Pradesh; Shri Vishwas Sarang, M.L.A (Bhopal); Shri Manmohan Nagar, Chairman, Zila Panchayat, Bhopal; Shri Prem Chand Meena, IAS, Agriculture Production Commissioner, Madhya Pradesh; Dr Rajesh Rajora, IAS, Principal Secretary (Department of Farmer Welfare & Agriculture) of Government of Madhya Pradesh. The program was jointly organized by the Government of Madhya Pradesh and the ICAR- Indian Institute of Soil Science, Bhopal, which was attended by more than 25,000 farmers from different districts of the State. The program started with a welcome remark by Dr. Ashok K. Patra, Director of the ICAR- Indian Institute of Soil Science and introductory remark by Dr. Rajesh Rajora, IAS, Principal Secretary, Department of Farmer Welfare & Agriculture, Government of Madhya Pradesh. On the occasion, Shri Gauri Shankar Bisen, the Hon'ble Minister of Agriculture, Government of Madhya Pradesh highlighted the importance of soil health and its testing in sustainable agriculture. He elaborated upon the plan of Government of Madhya Pradesh for state wide soil testing for preparation of soil health cards for the farmers. In the program, Hon'ble Chief Minister Shri Shivraj Singh Chouhan Ji emphasized the importance of soil testing and balanced fertilization in preserving the quality of soil, water and food for the present and future generations. Similar to human health, he said, it is necessary to maintain soil health with balanced fertilization of all nutrients including micronutrients. In his address, he also expressed the commitment of the government to make agriculture a profitable occupation. He said that a state wide campaign for soil testing is being undertaken with a soil testing laboratory to be opened in each Development Block. He urged the farmers to test their soil and use fertilizers as per the recommendation so as to



Kisan Mahasammelan and Soil Health Card Distribution Program on World Soil Day 5 December 2015

reduce unnecessary expenditure. Further, stressed upon the importance of crop rotation and ill effects of crop residue burning on soil and environment. He appealed the farming community to shed the practice of crop residue burning. In the program, the Hon'ble Chief Minister distributed soil health cards to farmers from different districts including farmers from tribal districts of Madhya Pradesh.

On the occasion, a Kisan Sangosthi was organized and exhibition stalls on agricultural technologies were showcased. Several experts from ICAR-IISS, ICAR-CIAE, Agricultural Universities, and State Departments spoke on various topics including soil health, conservation agriculture, irrigation techniques, pests and disease management, credit availability and Government schemes in agriculture.

Training cum awareness programmes for tribal farmers of Jhabua, Alirajpur and Dhar districts, MP

Training cum awareness programmes for tribal farmers of Jhabua, Alirajpur and Dhar districts of Madhya Pradesh were organized on "Sustainable Soil Health and Integrated Nutrient Management for Better Crop Productivity" on 8th October, 2015 at KVK, Jhabua, 9th October, 2015 at DDA office, Alirajpur and 13th October, 2015 at KVK, Dhar. Scientists from ICAR-IISS, Bhopal, and KVKs and State Agriculture Department officials were involved in imparting training to the tribal farmers. During the training programme, experts delivered talk on importance of soil

sampling, soil fertility status, soil testing and fertilizer recommendation and their usefulness for better crop cultivation and sustainable soil health management, appropriate soil and water conservation measures, integrated nutrient management modules, scientific methods of crop cultivation and effective crop management under adverse weather conditions. Also technologies developed by IISS for improving soil health and crop productivity were elaborated. During the training programme, pamphlets on: 1. Soil Testing: Why, When and How; 2. Resource



Training cum awareness programmes to the tribal farmers

Soil health card and fertilizer distribution to the farmers

Conservation Technologies; 3. Best Management Practices for Soybean Cultivation; and 4. Scientific Methods of Wheat Cultivation were released and distributed to the farmers. In addition to this, training materials, soil health card and fertilizers such as Urea (150 bags), SSP (150 bags), MOP (100 bags), $ZnSO_4$ (350 kg) were distributed to the farmers. A group discussion was also arranged and many technical problems / issues raised by the farmers regarding crop cultivation, particularly on soil management were deliberated. In this training programme, nearly 250, 175 and 110 farmers from Jhabua, Alirajpur and Dhar, respectively were actively participated.

Exposure visit cum Training programme for the farmers of Alirajpur, Jhabua and Dhar districts, Madhya Pradesh at ICAR-IISS, Bhopal

Exposure visit cum Training programme for the farmers of Alirajpur, Jhabua and Dhar districts, Madhya Pradesh was organized at ICAR- Indian Institute of Soil Science, Bhopal during 03-05 December, 2015 under Tribal sub-plan (TSP) fund. During this programme experts gave their talk on different aspects of soil management, farmers were exposed to all the facilities available in the institute such as soil Museum, divisions and laboratories, experimental fields, library and also they had visit to ICAR- CIAE, Bhopal. About 50 farmers from these districts were actively participated in this programme. Training materials like pamphlets, manuals and $ZnSO_4$ fertilizer 5 kg each were distributed to all the participants and also 60 soil health cards were prepared and distributed to them.



Field and laboratory visits



Training to the farmers



Fertilizer distribution to the farmers



Soil Health card distribution to the farmers

Demonstration trials in the farmers' fields of Alirajpur, Jhabua and Dhar districts, Madhya Pradesh

Frontline demonstration trials (12 Nos; 8 for soybean and 4 for maize) were conducted in the farmers' fields to disseminate the Institutes technologies like IPNS and STCR among the tribal farmers of Alirajpur, Jhabua and Dhar districts.



Demonstration trials in the farmers' fields

Workshops/ training programs organized

Vanmahotsav programme was organized during 1-7, July 2015 at ICAR-IISS, Bhopal.

Organized training on "Mridaparikshak" to three rural youths during July 23-25, 2015 at ICAR-RCER, Patna and these rural youths were given Mridaparikshak by Hon'ble Prime Minister on ICAR Foundation Day, on July 25, 2015.



Hon'ble Prime Minister Distributing Mridaparikshak to rural youth in Patna

Organized an ICAR sponsored 21 days winter school on "Advance soil biological approaches for managing carbon sequestration and climate change mitigation" during Sep 2-22, 2015 at IISS Bhopal.

Organized a training on Minilab "Mridaparikshak" for 16 KVKs from Madhya Pradesh during 16-17, November, 2015



Organized Children awareness programme to commemorate International Year of Soils 2015 in collaboration with Bhopal Chapter of Indian Society of Soil Science (ISSS) at ICAR Indian Institute of Soil Science, Bhopal on 19th Nov., 2015.



Organized a Workshop and Panel Discussion on 'Healthy Soils for a Healthy Life' on 19th November, 2015 at IISS, Bhopal as a part of celebration of the International Year of Soils 2015.

Organized an ICAR sponsored Short Training Course on "Geo-informatics in Natural Resource Management and Climate change Mitigation" during 20-29 November 2015 at IISS Bhopal.



MTC during December 14-21, 2015

Organized a Model Training Course (MTC) on "Advances in Soil Health Assessment and Preparation of Soil Health Cards for Enhancing Crop Productivity and Improving Soil Quality" during December 14-21, 2015 at IISS, Bhopal.

A follow-up training on 'Infrared Spectroscopy use in Soil Health Assessment' was organized at this institute during 14-17th December 2015 under the ICAR-ICRAF collaborative programme. Dr. Erick Towett, Scientist (Soil Spectroscopy) from World Agroforestry Centre, Nairobi, Kenya was the resource person for the hands-on practical and theory based training on Mid-Infrared spectroscopy and portable X-ray fluorescence (pXRF) Spectroscopy for soil and plant analysis. Twelve scientists from ICAR Indian Institute of Soil Science (IISS), Bhopal, and Central Agroforestry Research Institute (CAFRI), Jhansi have participated in the training programme.



Training Program on Infrared Spectroscopy's use in Soil Health Assessment

ICAR-IISS Bhopal, organized **Jai Kisan Jai Vigyan** programme during 28- 29, December 2015 at Perwalia Sadak, Bhopal.

Farmers training programme:

Dr A K Tripathi and Dr M C Manna Conducted a farmers training programme for the farmers from PD (ATMA) Shivpuri MP during 7-11 Dec, 2015 at IISS, Bhopal. Total 32 farmers participated in the training programme. The training was conducted on the subject "Soil health management and organic farming".

Drs. J. K. Saha, S. Kundu, M. Vassanda Coumar, M. L. Dotaniya and S. Rajendiran organized one day farmers training cum awareness programme on "Improving soil health for sustainable crop production" for the tribal farmers at Jhabua, Alirajpur and Dhar on 8, 9, 13 Oct., 2015.

Drs Rajendiran S., M. L. Dotaniya, M. Vassanda Coumar, J. K. Saha, S. Kundu organized Tribal farmers exposure visit and training on 3-5th Dec., 2015 at ICAR-IISS, Bhopal.

Students Guided

Dr. R. Elanchezian guided a M.Sc. student, Mr. Dameshwar Kumar of Indira Gandhi Krishi Vishwavidyalaya (IGKV), Raipur for M.Sc. (Plant Physiology) dissertation work.

Dr. S. Srivastava guided a M.Sc. student, Ms. Chandraprabha Miri of Indira Gandhi Krishi Vishwavidyalaya (IGKV), Raipur for M.Sc. (Soil Science) dissertation work.

Mera Gaon Mera Gaurav (MGMG) Activities

About ten team of scientists were formed and conducted benchmark survey (information regarding major crops, cropping systems, management practices viz. use of organic matter, fertilizer application, seeds, varieties and other socio-economic status of farmers viz., population, farm families, and size of land holding etc.) of selected villages and developed road map/action plan for each village and also indentified the problems.



Scientists interacted with farmers



Scientist team monitoring rice crop at farmers field

- ◆ In order to enlighten the farmers, on spot advisory related to insects, pests and diseases in soybean crop was given to farmers and they were also sensitized for soil health card, crop scouting and keeping close watch on the occurrence of insects, pests and diseases etc.
- ◆ A field experiment was conducted on farmers' fields under the Conservation Agriculture Platform (CAP) at Khamkheda village. A multi-disciplinary team of scientists demonstrated conservation agriculture techniques like no-tillage, crop residue management, crop rotation and runoff management, diversified agriculture and horticulture, and soil management practices for better soil health and productivity under changing climate change scenario.

Distinguished visitors

1. Shri Shivraj Singh Chouhan Hon'ble Chief Minister of MP on 5 Dec 2015
2. Shri Gauri Shankar Bisen, Hon'ble Minister of Agriculture, MP on 5 Dec 2015
3. Shri Vishwas Sarang, M.L.A (Bhopal) on 5 Dec 2015
4. Shri Manmohan Nagar, Chairman, Zila Panchayat, Bhopal on 5 Dec 2015
5. Shri Prem Chand Meena, IAS, Agriculture Production Commissioner, M.P. on 5 Dec 2015
6. Dr Rajesh Rajora, IAS, Principal Secretary (Farmer Welfare & Agriculture) MP on 5 Dec 2015

Programs held

Independence Day celebrations

The staff recreation club of ICAR-IISS celebrated the 69th 'Independence Day' (15 August, 2015) with great zeal and enthusiasm. Various sports and cultural events were organized for the staff and their family members at the institute and prizes were distributed to winners of all the events by Patron, SRC, Dr. Ashok K. Patra.



69th Independence Day celebrations

Staff News (PERSONNEL)

Employees on foreign deputation		
Sl No	Name	Duration
1	Dr. Sangeeta Lenka, Scientist	01-04-2015 to 30-09-2015
2	Dr. J. Somasundaram, Sr. Scientist	01-05-2015 to 20-10-2015
3	Dr TapanAdhikari, Pr. Scientist	26-08-2015 to 25-02-2016

Staff transferred from the institute		
Sl No	Name	Date
1	Dr. T.K.Radha, Scientist (Microbiology), transferred to IIHR, Bangalore	11-12-2015
2	Dr. I. Rashmi, Scientist (Soil Science), transferred to CSWCRTI, Regional Station, Kota	31-12-2015

Scientists' participation in Conferences/ Seminars/ Trainings/ Workshops

Name	Program	Venue	Period
Dr. Sudeshna Bhattacharjya	NAARM-Professional Attachment Training	ICAR-Indian Agricultural Research Institute, New Delhi	May 11 to Aug 11, 2015
Dr. Abhay Shirale	NAARM- Professional attachment training	ICAR-DSR, Indore	May 11 to Aug 11, 2015
Dr. M. Vassanda Coumar	National seminar on application of radioisotopes and radiation technology in industries, agriculture, healthcare and its impact on environment	AISECT University, Bhopal	Jul 3-4, 2015
Dr. S. Lenka	Global Centre for land based Innovation workshop on Mining microbial dark matters	Leura, Blue Mountains, New South Wales, Australia	Jul 16-17, 2015
Dr. Asha Sahu	ICAR summer school on "Biomass and biofuel: technologies, climate change and environment"	ICAR-CIAE, Bhopal	Jul 22-Aug 11, 2015
Dr A. B. Singh	National Seminar on "Youth Ready for Climate Change Transformation"	IIFM, Nehru Nagar Bhopal	Jul 28-29, 2015
Dr. S. Srivastava	Regional Workshop on "Soil Health Assessment"	ICAR-IISS, Bhopal	Aug 7, 2015
Dr. A.K. Biswas	National Conference on Application of Clay Science in Agriculture, Environment and Industry	Clay Mineral Society of India, New Delhi	Aug 7-8, 2015
Dr. J. K. Saha and Dr. M. Vassanda Coumar	Orientation Programme on Ministry of Environment, Forest & Climate Change	Indra Paryavaran Bhawan, New Delhi	Aug 12, 2015
Dr. N.K. Lenka	NAAS Brainstorming Session on "Issues and Challenges in Shifting Cultivation and its Relevance in the Present Context"	NAAS, New Delhi	Aug 17, 2015
Dr. A.O. Shirale, Dr. Asit Mandal	Training programme on Principle and Functioning of Mridaparikshak-a soil minilab developed	ICAR-IISS, Bhopal	Aug 17-19, 2015
Dr. Muneshwar Singh	National Seminar on organic ameliorants for soil resilience and environmental securities	RVSKVV, Gwalior	Aug 19-21, 2015
Dr.A. B. Singh	10th Annual Group Meeting of Net Work Project on Organic farming	MPUA & T, Udaipur (Rajasthan)	Aug 19-21, 2015
Dr. J. K. Saha	National Symposium on Sustaining Agriculture Productivity in Arid Ecosystems: Challenges & Opportunities	Regional Research Station of CAZRI, Leh, J & K	Aug 19-22, 2015
Dr. K Ramesh and Mr. Deepak Kaul	Kisan Sanghosti, Agricultural exhibition cum foundation stone laying ceremony of the NRC for IFS	PipraKothi, Motihari, Bihar	Aug 20-21, 2015
Dr. D.L.N. Rao	Workshop on 'State of Indian Soils'	NAAS, New Delhi	Aug 21, 2015
Dr. S. Srivastava	National Workshop on Soil Health Card	Udaipur, Rajasthan	Aug 23-25, 2015
Dr. K. Ramesh and Dr. A.K. Vishwakarma	Kisan Sanghosti cum Agricultural exhibition on Soybean production technology	ICAR-Directorate of Soybean Research, Indore	Aug 25, 2015

Name	Program	Venue	Period
Dr. B.P. Meena	International Training programme on "Conservation Agriculture (CA): Developing Resilient Systems"	CSSRI, Karnal, India	Sep 2-11, 2015
Dr. A.K. Biswas	National Seminar on Soil Health Management and Food Security: Role of Soil Science Research and Education	NBSS & LUP, Kolkata	Oct 8-10, 2015
Dr. R.H. Wanjari	International Conference i.e. 25 th Asian Pacific Weed Science Society (APWSS) Conference on "Weed Science for Sustainable Agriculture, Environment and Biodiversity"	DWSR, Jabalpur	Oct 13-16, 2015
Dr. A.B. Singh	Sensitization Workshop on Mera Gaon Mera Gaurav	ICAR-ATARI, Zone-VII, Jabalpur	Oct 14, 2015
Dr. S. Srivastava	1st preparatory meeting of task force on India Afghanistan collaboration	Krishi Bhavan, New Delhi	Oct 15, 2015
Dr. A.B. Singh	National Conference on Carbon Materials for Energy Applications	National Physical Laboratory, New Delhi	Oct 15-16, 2015
Dr. S. Srivastava	Workshop on KrishiManthan	Department of Farmer welfare and Agriculture, Bhopal	Oct 31, 2015
Dr. N.K. Lenka	Workshop on Developing roadmap for agricultural development in Agro-Climatic Zone IX (Western Plateau and Hills)	Directorate of Soybean Research, Indore	Nov 4, 2015
Dr. K. Ramesh	International conference on sustainability development goals through organics	Cochin, Kerala	Nov 5-7, 2015
Dr. J. K. Saha	Rural and Urban Solid Waste Management for better Agriculture and Environment	Defense Research & Development Establishment, Gwalior, M.P.	Nov 19, 2015
Dr. S. Srivastava	International Grassland Seminar	NASC Complex, New Delhi	Nov 20-24, 2015
Dr. A.O. Shirale, Dr. S. Bhattacharya	ICAR sponsored short training on "Geoinformatics in Natural Resource Management and Climate change Mitigation"	ICAR-IISS, Bhopal	Nov 20-29, 2015
Dr. M. L. Dotaniya Dr. S. Rajendiran	International Conference on Innovative Agriculture for Rural Prosperity	Search & Research Society of Bhopal	Nov 27-28, 2015
Dr. K. Ramesh	Developments in soil science 2015	University of Agricultural Sciences, Bengaluru	Dec 7, 2015
Dr. J. K. Thakur	56 th Annual Conference of Association of Microbiologists of India	JNU, New Delhi	Dec 7-10, 2015
Dr. R. Elanchezian	3rd International Plant Physiology Congress – "Challenges and Strategies in Plant Biology Research"	ISPP & JNU, New Delhi	Dec 11-14, 2015
Dr. R.H. Wanjari	National Conference on "Global Research Initiative for Sustainable Agriculture and Allied Sciences"	RVSKVV, Gwalior	Dec 12-13, 2015
Dr. A.B. Singh	3 rd International Conference on "Environmental Friendly Agriculture, Horticulture in Planning of a Smart City"	Noor-Us Sabha, Bhopal	Dec 12-14, 2015
All scientists of IISS	Brain storming on waste management	ICAR-IISS Bhopal	Dec 15, 2015
Dr. Asit Mandal	CAFT on "Application of computer algorithms and software packages in Agriculture"	IASRI, New Delhi	Dec 18, 2015 to Jan 7, 2016

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