IISS Newsletter

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DG, ICAR Visits IISS

Dr. S. Ayyappan, Hon'ble Secretary to Govt. of India and Director General, ICAR and Dr. A.K Singh, DDG (NRM), ICAR visited the institute on 15th June, 2011. Hon'ble DG has shown keen interest in the research work of the institute by enquiring about the on going research work of the scientists, visiting the field experiments and laboratories, and briefly addressing the staff. He impressed upon the scientists for taking up smaller number of comprehensive projects with a focus on frontline and thrust areas. He also highlighted the need for good team work to achieve holistic results. He desired that senior level scientists may act as mentors and guide the young scientists for quality output.

In This Issue

Director's Desk

Need for nutrient budgeting for sustainable agriculture

In India, diversity exists in the quality and quantity of natural resources and their distribution with respect to time and space. For example, India hosts 15% of the animal population, which, apart from supplying milk and draught power in agricultural operations, contributes valuable plant nutrients as supplement to the fertilizer nutrients. Indian cattle, however, have different genetic make up compared to the those in developed countries. They are smaller in size with lower body weight, low in milk production and adapted to the different climatic conditions and different feeding habits besides their different heritage. Consequently, the different types of manures, derived under such varying environments do differ in their physical and chemical composition due to the differences in the type of animal used to produce dung, animal density, nutrient density of the feed material, type of work an animal is put to use and management factors. IISS, Bhopal developed a database at district level of dung produced and manure availability alongwith its composition .

Even though the human population is increasing at an alarming rate, the cattle population growth is almost stagnant. This is evident from the animal census data of 1997 and 2003 which show a cattle population of 198 and 185 million, respectively. This decrease is primarily due to a decrease in indigenous cattle. The buffaloes population has increased from 89 to 98 million but this is not sufficient to compensate the decrease in cattle population. This shows that the dung manure availability in the country is also not increasing and is estimated to be at around 1.5 tonnes/ha of net cultivated area. An allowance of 15% could be made in this if the dung manure available from other animals like goats, sheep, poultry, horses, pigs etc are included. The total dung manure available would be around 1.7 t/ha. The total N, P_2O_5, and K_2O supply is estimated to be around 1.5, 1.0, and 1.8 million tonnes, respectively for the whole country. In addition, based on 2006-07 crop year data, we have estimated an availability 0.22, 0.16, 0.36 million tonnes of N, P_2O_5, and K_2O, respectively from crop residues, assuming only 5% of the residue would be recycled in agriculture and rest would be consumed as cattle feed, burnt or in future might go in for energy generation. Also, some N would be added through symbiotic and free living nitrogen fixers. The addition through green manure crops is estimated to be 0.11 million tonnes. It is estimated that 5-14 million tonnes of compost can be prepared from municipal solid waste depending upon the method of composting. This could at maximum add 0.1, 0.06, and 0.09 million tonnes of N, P_2O_5, and K_2O.

The first estimate of nutrient removal by crops was made by National Commission on Agriculture (NCA). At a foodgrain production of 82 million tonnes in 1961, the total $N+P_2O_5+K_2O$ removal was estimated to be 9.5 million tonnes, including the nutrient removal by other crops. The figure of nutrient removal for 1971 was 12.3 million tonnes at a production level of 108 million tonnnes of foodgrain. Based on these nutrient removal data, it was found that there was a net negative balance of N, P_2O_5, and K_2O to the tune of 8-10 million tonnes during 60s, 70s, and 80s if only the additions through fertilizers are taken in computation. This was true for the three decades. However, this got slightly changed thereafter. owing to a lesser growth rate in the agricultural production than was projected but, the application of fertilizer nutrients continued to increase at a higher rate. For the year 2006-07, we estimated a total nutrient removal of 10, 4.2, and 12.4 million tonnes of N, P_2O_5, and K_2O, respectively at a

foodgrain of 217 million tonnes. The additions through fertilizers were 13.8, 5.5, and 2.3 million tonnes of N, P_2O_5, and K_2O, respectively. This leaves a net negative balance of 5.0 million tonnes of N, P_2O_5, and K_2O and this again is due to a heavy negative balance in case of potassium. The total nutrient imbalance would be corrected to some extent if we include the nutrient additions through dung manures (4.3 million tonnes of N, P_2O_5, and K_2O from cattle and buffaloes) and crop residues (0.74 million tonnes). However, this does not mean that our soils are adequately fertilized/manured. There are several areas in Rajasthan, Gujarat, and Madhya Pradesh where the balance is negative in case of N. Similarly, even P balance is negative in some districts of Uttar Pradesh, Madhya Pradesh and Kerala and K balance is negative in almost 80 per cent districts in India. A higher growth rate in agriculture is expected in future which would accentuate the problem further if careful attention is not paid in the areas where the net budget is negative. These nutrient budgets are only apparent in nature because they do not take into consideration the nutrient additions through natural processes like rainfall, irrigation water, sedimentation from upper reaches and also the losses of nutrients through leaching, volatilization, run off etc. It is important that work is initiated in this direction to compute such additions and deletions so that we could reach to a better understanding of region specific nutrient budgets to guide us in managing the plant nutrients.

India is endowed with variable climates, different strata of farmers ranging from marginal to large practicing variable crop and nutrient management options. These factors change the nutrient recovery from the applied manure. There is a need to compile the manure preparation and handling practices in different parts of the country specific to different situations. The amount and type of the animal feed is important w.r.t. the milk yield and manure nutrient composition. A compilation of the crop residues and its composition used as cattle feed, the availability of concentrated feed material (manufactured and imported) and composition of different cattle feed, the region-specific availability of grazing land and amount and type of pasture, the amount of feed depending upon the type and age of animal is important for determining not only the quantity and quality of manure but also will be helpful in computing enteric methane emission coefficients from animals and methane emission potential of manures.

The availability of fertilizer nutrients (both major and micro) is important for making an overall assessment of region-specific nutrient availability in India. Also, the nutrient requirement of crops vary depending upon the crop species, varieties (hybrid vs. local) and also with the change in climatic and management conditions. The region specific nutrient mining data taking into account type of crop, yields obtained, the amount of residues removed and the partitioning of nutrients into the above and below ground plant parts will help in assessing the nutrient balances in different agro-ecoregions. There is need to establish a connectivity by compiling all the information of nutrient management with the quantity and quality of nutrients available from different sources in different regions and management practices so as to suggest the possible guidelines in the direction of improved nutrient management. It is important to compile, synthesize and process the nutrient region-specific information and present it into a user friendly database as also in the form of spatial maps so that the information could be used by many.

(A. Subba Rao)

Research Highlights

Evaluation of soil quality

Soil quality evaluation of two districts, namely, Sehore (having high applied nutrient use) and Vidisha (relatively low nutrient use) under ASER 15.1 was done using 15 known indicators, with assigned weight for each indicator. Each of the indicators was divided into four classes namely, Class – I, Class – II, Class - III and Class - IV with a assigned marks of 4, 3, 2 and 1, respectively. The soil quality index (SQI) was calculated by the following equation:

$$SQI = \sum Wi\, Mi,$$

Where, Wi is the weight of the indicator and Mi is the mark of the indicator classes. Thus, summing up of all the 15 indicators resulted the SQI value for a particular soil of the farmer's field. The maximum value of SQI is 400 (best quality) and minimum value is 100 (poor quality soil). In order to judge the SQI value of any site against the theoretical maximum value of SQI (i.e. 400), the concept of relative soil quality index (RSQI) was used which is given by

$$RSQI = \frac{\text{SQI of the given site}}{\text{Maximum threshold value of SQI}} \times 100$$

The soils of Sehore and Vidisha districts were classified into three categories based on RSQI values. The soils having RSQI value less than 50% were rated as poor quality soil where the observed relative yield was 51.86%. The soils having RSQI value ranging from 50 – 70% were rated as medium category where the observed yield was 66.61%. The soils having RSQI value > 70% were rated as good category where the observed yield was 75.58 %. The results indicated that this approach of rating soil health using 15 soil indicators can be used for evaluation of vertisols in any agro ecoregion.

Nano-phos: A potential P fertilizer for crops

A series of solution culture experiments conducted with maize, soybean, wheat and barley crops clearly established

that P from nano rock phosphate particles can easily be taken up by the crops and behaved similar to the P supplied through water soluble P fertilizers.

The laboratory experiments conducted to quantify the extent of benefit of P solubilization due to interaction of microbes and nano-size particles clearly showed that bacterial *(Pseudomonas striata)* inoculation resulted 8.56, 10.49 and 14.50 % solubilization of the total P contained in 125 micrometer sized rock phosphate respectively. When the same rock phosphate with nano size particles (106.6 nm) was inoculated with bacterial culture, 11.45, 33.73 and 36.15% solubilization of the total P was observed after 24, 48 and 72 hours of incubation, respectively. Attempt was also made to study the effect of fungal inoculation on the solubilization of P from nano-rock phosphates. The extent of P solubilization from different nano-rock phosphate due to fungal culture inoculation increased from 8.17 to 34.32% in case of Udaipur rock phosphate and 7.83 to 30.95% in case of Sagar rock phosphate. Among the two fungal cultures, black spores forming fungal culture showed higher potential to solubilize P from nano-rock phosphate.

The pot culture experiment conducted with maize crop on four diverse soils (Vertisol, Alfisol, Aridisol and Inceptisol) clearly indicated relatively higher yield response to nano-rock phosphate in all the soils as compared to micron sized rock-phosphates. Further the results suggested that crop utilization of P from nano-rock phosphate was at par with that of P from Single Superphosphate in Vertisol and Inceptisol, while the yield response to P from nano-rock phosphate was marginally lower than to P from SSP in Alfisol and Aridisol. A field experiment was also conducted with sorghum and finger millet wherein the crops were fertilized with nano-rock phosphate at the rate of 50 kg P_2O_5/ha in water suspension (265lit/ha) stabilized with 150 ml of linear Alkyl Benzene Sulphonate (LAS). The results also showed that mean yield of sorghum increased from 1350 kg/ha to 2228kg/ha and finger millet yield increased from 640 to 1048 kg/ha due to nano-rock phosphate application. However, there is a need for extensive field trials to establish the efficacy of nano-rock phosphate for crop production and commercial utilization of large deposits of low-grade indigenous phosphate rocks as direct source of P as fertilizer.

Sulfur is essential for yield sustainability in Vertisols

Decline in crop productivity was recorded on continuous absence of S in fertilizer schedule in long term fertilizer experiments (LTFE). To examine the response of S, Jabalpur centre conducted satellite experiment. The data obtained from the farmers' fields clearly demonstrated a good response to S in both soybean and wheat. To sustain and enhance the productivity, S application is essential. However, application of 5 t FYM over and above NPK has taken care of S requirement.

Participatory integrated nutrient management for soils of Nagaland

A study initiated for evaluating the balanced and integrated nutrient supply for paddy crop at eight sites in Nagaland state revealed high yields especially under wet rice cultivation system (Fig.1). The highest yield of rice was obtained in the Singrijan village in Dimapur district. Among different modules, 50% NPK + 5t FYM + green manuring resulted in the maximum yield at various locations (Plate 1).

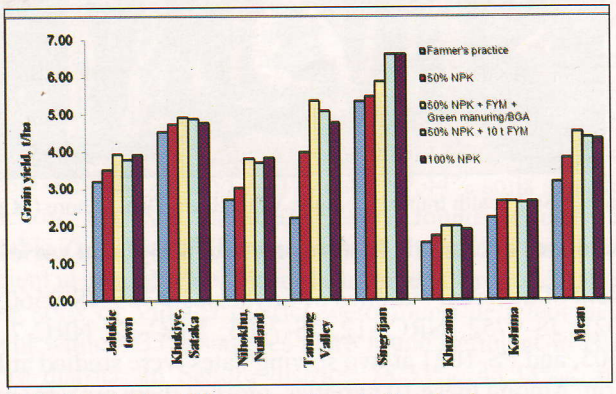


Fig. 1. Paddy yield at different locations in Nagaland

Plate 1. Dhaincha an important component in INM modules at Nuiland village, Dimapur

Participatory assessment of qualitative parameters for categorizing different degrees of soil quality

Soil quality parameters were assessed using field tools under three farming systems in two villages of Madhya Pradesh (MP). Three farming systems viz. i) Organic manure based farming: ii) Inorganic farming and iii) Integrated farming systems were identified under soybean–wheat cropping system. Total 12 parameters of soil quality assessment comprising of soil physical, biological and chemical parameters were determined in selected farmers' fields using low-cost farmer-friendly tools. The weighted average values of these parameters as assessed in the field, placed organic manure based farming in 'Good' category of soil health followed by integrated farming system that recorded 'Fair' category overall. These field assessed values were backed up by quantitative values of these parameters as determined in the laboratory using scientific instruments, and the results supported the inferences drawn by field tools. Two farmer's training camps were also organized at Parwalia (Dist.Bhopal) and Vaidakhedi (Dist. Sehore), MP to educate the farmers on good agricultural practices (Plate 2).

Plate 2. Soil health training camp at Vaidakhedi, Dist. Sehore (M.P)

Influence of climatic factors on yield of soybean varieties

Yield of different varieties of Soybean JS-335, JS-9560, JS-8021, JS-9752, NRC--12, JS-7105, NRC-37, NRC-7, JS-9305, and PS-1021 at two sowing dates were studied at IISS farm. Among these 10 varieties, most of them are very much sensitive to the sudden change in soil moisture and atmospheric temperature. But all the varieties in the first sown plots thrived well compared to the second sown plots indicating that the sowing dates have profound influence on the yield of crop. The variety JS-9560 gave 30% greater yield than JS-9305 which also thrived better in the first sown date. Other varieties like JS 335 and NRC 37 showed better performance than the other 6 varieties. The variety JS 9560, which is a short duration variety, found to escape the terminal drought and so yielded more compared to others which are having a longer duration than JS 9560. JS 9305 is a very good yielding variety but the sudden change in soil moisture content and increase in atmospheric temperature led to sudden wilting of the plant so yield was low even though they had good number of pods. The variety JS 335 was found to survive even in the adverse conditions and gave comparatively good yield. But the pest and disease infestation was very high in this variety. The variety JS 9752 (long duration) was unaffected by mosaic and thriving best in the hot sun.

Soil organic carbon pools vis-à-vis climate change

The higher concentrations of active C pools such as soil microbial biomass carbon (SMBC), water soluble carbon (WSC) and acid hydrolysable carbohydrates (AHC) were observed in NPK+ FYM treated plots in Vertisol under soybean–wheat rotation at Jabalpur. The slow pool like particulate organic matter carbon (POM-C) fraction decreased substantially (20 -36.9 %) at 60% moisture holding capacity (MHC), and to a lesser extent (2-8.6 %) under submerged condition. Similar trend was observed for acid hydrolysable carbohydrates. C-mineralization rate increased with increase in temperature from 25 to 45 °C at soil moisture of 60% MHC as compared to submerged condition in all fertilizer and manure treatments during 90 days of incubation. C-efflux was greater during April-May and July-August.

Loss of water through bypass flow in no tillage (NT) Vs reduced tillage (RT)

Effect of NT (direct sowing with no till slit drill) and RT (one pass rotavator and sowing with seed cum fertilizer drill) was evaluated on loss of water through bypass flow in soybean-wheat system in vertisols. Loss of water beyond 60 cm soil depth was 37% and 56% in RT and NT, respectively. The intensity as well as depth and width of cracks in NT were also significantly more than in RT. This could have resulted in less loss of water through bypass flow in reduced tillage.

Structural and functional microbial diversity in soil

Microbial mediated bioreduction of terminal electron acceptors in tropical soils of long term agroecosystem are affected by the type and dose of fertilizer application. Inorganic fertilizers applied alone and/or with organic amendments regulate the microbial metabolic processes differentially under anaerobiosis.

Agricultural farming system and crop quality

Application of 100 % NPK along with FYM not only resulted in improvement in the nutritional quality constituents such as protein, tryptophan (amino-acid) and nutritionally important micro elements of wheat grains but also improved the 100-grain weight of wheat. Organic management practices recorded the highest soybean seed yield which was 22.4 % higher than the inorganic management practices. The incessant rains and cloudy weather aggravated the insect problem and there was a drastic reduction in overall soybean yield in the year 2010. Nutritional quality constituents' viz. protein and oil contents were better in the organic management practice than inorganic management practice but were at par with integrated nutrient management. Soil organic carbon, available P and K status were improved under organic management compared to the chemical and integrated nutrient management systems. Dehydrogenase activity followed the same trend. There was higher available N and K under soybean-wheat cropping system when the combined application of *Panchagavya*.

Improving soil chemical and biological health under organic farming

Under organic farming, the soil analysis data clearly indicated that the effect of *Panchagavya* with organic manure and also with organic manure + biodynamic formulation applications on soil quality. The soil organic carbon, available N, P and K were higher in OM + BD + PG treatment compared to other nutrient management systems. The soil biological activity (dehydrogenase) was higher in these treatments as compared to the control and bio-dynamic alone.

Response of different floriculture plant species to chromium

Different floriculture plant species (calendula, chrysanthemum, aster and dahlia) were screened for their

tolerance to different levels of Cr (0, 5, 10, 15, 20, and 25 ppm). In all the four plant species, beyond 10 ppm, chromium was toxic to the plants resulting in drastic reduction in growth (Plate 3). In 20 and 25 ppm, there was negligible growth and led to mortality of the plants. In calendula, chrysanthemum and dahlia the application of chromium beyond 10 ppm inhibited flowering. The chromium content in different plant parts of calendula, chrysanthemum, dahlia, and aster was determined. In all the plant species, the highest concentration of Cr was found in the roots followed by shoots and flowers. Dahlia recorded the highest concentration of chromium among the plant species and calendula the least.

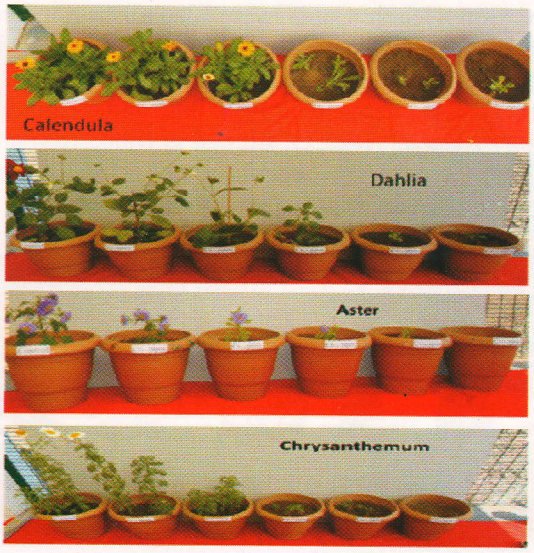


Plate 3. Effect of different levels of Cr on some floriculture plants

Plant Growth Promoting Bacteria from Vertisols and Composts

Plant growth promoting rhizobacteria (PGPR) improve plant growth through biological nitrogen fixation, solubilization of phosphorus, production of hormones, production of antibiotics that suppress pathogens etc., all of which contribute to provide a healthy environment for better plant growth. Beneficial bacteria were isolated from rhizosphere of soybean, chickpea and wheat growing in vertisols of Madhya Pradesh and from vermicast and vermicomposts. After extensive laboratory and field screenings a database of 50 PGPR has been prepared. In field studies, PGPR strains gave an average increase in grain yield of 25.6% in soybean, 41.5% in chickpea and 16.2% in wheat. Oligotrophic bacteria that grow in very dilute environments were as effective as copiotrophs in PGPR effect. Rhizobium strains gave an average increase in grain yield of 15.8 % in soybean and 12.1 % in chickpea. Full gene sequence of 16s ribosomal RNA of 23 bacteria have been deposited in NCBI. Of these, 10 gene sequences were of oligotrophic bacteria. 17 PGPR have been deposited in NBAIM, Mau and allotted accession numbers.

Effect of continuous cultivation on changes in nutrient status of Sehore and Vidisha districts of Madhya Pradesh

Between the two districts of AESR 15.1, input use is normally high in Sehore district while input use is low in Vidisha district. The nutrient status of the farmer's field soils was compared with the status of the pristine soils.

The result showed that 70% and 27.5% of the soils of Sehore district were having OC content in medium and low range while 75.64% of the soils were low in OC content in Vidisha district. Both the districts are having around more than 80% soils having available P status in medium range and more than 75% soils are medium in available K status. Available S status was high in more than 50% of the samples in both the districts while S deficiency was observed in less than 3% of the soil samples. Around 74.17% and 97.44% soils samples of Sehore and Vidisha district were found deficient in available Zn status, while none of the soil samples was found deficient in available Fe, Mn and Cu content. Around 29.48% of the soils of Vidisha district were found deficient in B content while 8.33% samples were found deficient in B in Sehore district. In Sehore district, 18.33%, 48.33% and 25.84% soils were found to have no deficiency, single nutrient deficient and two nutrient deficient category, but in Vidisha district 38.46%, 36.54 % and 18.59% soil samples were found to have deficient in one, two and three deficient elements.

Characterization of heavy metals in municipal solid waste compost

Institute investigated distribution of heavy metals in different size fractions of municipal solid waste compost samples of 12 different cities produced from different types of feedstock material.

Results showed that major fraction of the MSW compost belongs to > 500 µm size group (71.9%) and smaller size groups had about 3 to 7% of the total weight (Fig. 2). MSW compost samples produced from segregated biodegradable wastes (BWC) contained maximum material (87% by weight) in the >500 µm size group followed by those produced from partially segregated wastes (PSWC) (75%) and those produced from mixed wastes (MWC) (74%). Amount of finer size fractions were least in BWC as compared to MWC and PSWC (Fig. 3).

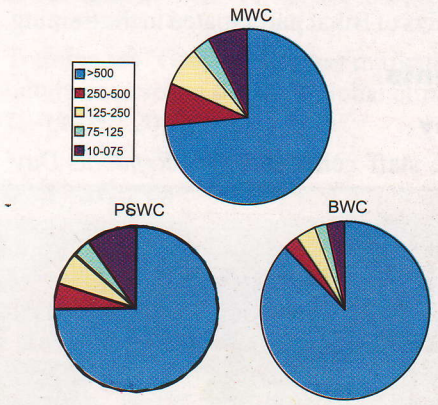


Fig. 2. Average distribution of weight of material (expressed as % of total) in different size fractions of compost prepared from different feedstock.

Heavy metals contents in the smallest size fraction of compost prepared from BWC were lower as compared to those prepared from partially segregated wastes or mixed wastes. As compared to whole composts, content of heavy

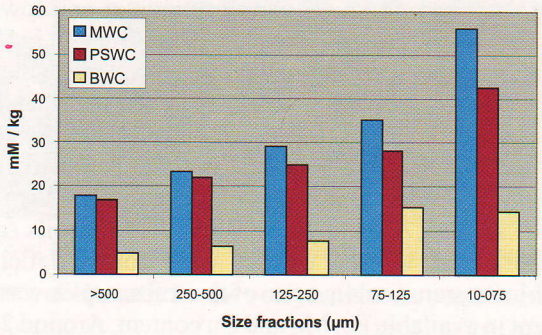


Fig. 3. Concentration of metals (mM/kg) in different size fractions of MSW composts prepared from different feedstock

metals in the biggest size fraction were lower by 26% in case of MWC, by 16% in case of PSWC and by 9% in case of BWC. This indicates that screening out of smaller size fraction with 0.5 mm sieve may significantly reduce heavy metal concentration in compost prepared from mixed solid wastes.

Awards and Honours

Ms. S. Neenu. received the IPNI Scholar award for the year 2010.

Extension Activities

Farmers' Day

Dr. A. B. Singh had coordinated the 5 days farmers' training in the institute during 04-08 January, 2011 sponsored by Diara Development Project, Bihar. Also coordinated the 3 days farmers' training programme in the institute during 17-19 January, 2011 and 17-19th February, 2011 sponsored by Farmers Welfare and Agriculture Department, Indore. Dr. A. B. Singh also coordinated 3 one week farmers' training programmes in the institute during 20-27 February, 2011; 29th March to 3rd April, 2011; and 20-27 April, 2011 sponsored by ATMA, Bihar. The farmers from Shekhpura, Areria, and Katihar districts of Bihar participated in the training.

Major Events

Republic Day

The Institute staff celebrated the '*Republic Day*' with all gaiety and fervour. Activities include races, poem recitation, songs, drawing competition for children, and musical chair for the women and men. The program was concluded with the distribution of prizes to the winners by Dr. A. Subba Rao, Director, Mrs. Subba Rao, and Dr. A.B. Singh, President,

Plate 4. Celebration of Republic Day

IISS Foundation Day Celebrations

IISS Foundation Day was celebrated on 16 April 2011. Dr. Pitam Chandra, Director, CIAE was the Chief Guest and Dr. S.K. Dhyani, Director, NRC on AF, Jhansi was the Guest of Honour. About 100 farmers participated in the celebrations. The Institute felicitated eight innovative farmers. One Hundred Soil Health Cards were also distributed to the farmers. Four lectures on Integrated Nutrient Management, Organic Farming, Micro-nutrient Management and Bio-fertilizers were delivered to farmers. Mr. Anil Dhingra, State Marketing Manager, IFFCO, Bhopal attended the function and shared the on-farm experiences of IFFCO with the farmers. (Plates 5 & 6).

Plate 5. Releasing of institute's publication on IISS Foundation Day

Plate 6. Farmers with soil health cards.

Sports

IISS, Bhopal was ranked 3rd in the ICAR Central Zone Sports Meet held at "Directorate of Weed Science Research" Jabalpur from 15-19 February, 2011. Ms. Neenu. S received Gold medals in Chess, Disc Throw and Long Jump and Silver Medals in Badminton Singles and Doubles, Shotput, 100m and 200m races and was selected as the best female athlete.

Short-Term Training Programme

Three short-term training programmes viz., 'Farmers' Resource based Site Specific Nutrient Management in Different Production Systems' (31 Jan. to 4 Feb., 2011,

course coordinators Dr. K. Sammi Reddy and Dr. A. B. Singh, Plate 7), 'Advanced Methods of Soil and Plant Analysis' (7-11 Feb., 2011, course coordinator Dr. J. K. Saha, Plate 8) and 'Recent Advances in Soil Physical Analysis and Management', (17-21 Jan. 2011, course coordinator Dr. R. S. Chaudhary) were organized by the institute. Agricultural officers and officials working in soil testing laboratories under Government of Orissa and Madhya Pradesh Vigyan Sabha took part in these training programmes. These trainings were sponsored by the Directorate of Agriculture and Food Production, Government of Orissa, Bhubaneswar.

Plate 7. Dr. A. Subba Rao, Director, IISS, Bhopal inaugurating the training programme

Plate 8. Training on advance methods of soil and plant analysis

NAIP Sponsored Training

National training on "Climate change, Carbon sequestration and carbon Credits" from 5-18 April, 2011 sponsored by NAIP, ICAR, New Delhi by Dr. Sangeeta Lenka (CourseDirector), Dr. N. K. Lenka (Course Co Director) and Dr. S. K. Kundu (Course Co Director) (Plate 9).

Plate 9. Inauguration of National Training on "Climate Change, Carbon Sequestration and Carbon credits"

Personnel

New Appointments

Shri Rajendiran S joined as Scientist on 10th January, 2011.

Shri Gyan Dutt Dubey joined as Finance & Accounts Officer on 28th March

Dr. Aravind Kumar Shukla joined as Project Coordinator (Micronutrient) on 31st March, 2011.

Smt. Kollah Bharti joined as Senior Scientist in the Division of Soil Biology on 5th April, 2011.

Dr. Brij Lal Lakaria joined the Division of Soil Chemistry and Fertility as Principal Scientist (Soil Chemistry / Fertility / Microbiology) on 3rd June, 2011.

Transfer

Dr. K. N. Singh, Principal Scientist transferred to IASRI, New Delhi w.e.f. 22.03.2011

Shri N. S. Raju, Scientist transferred to CRIDA, Hyderabad w.e.f. 22.03.2011

Dr. B. N. Mandal, Scientist transferred to IASRI, New Delhi w.e.f. 31.03.2011

Promotions

Shri Bansilal, UDC to Assistant on 29.03.2011

Shri Sanjay Katinga, SSS to LDC on 02.04.2011

Shri Vinod Choudhary, Lab. Assistant (T-2) to (T-3) on 30.10.2010

Shri Hukum Singh, Field Assistant (T-2) to (T-3) on 30.10.2010

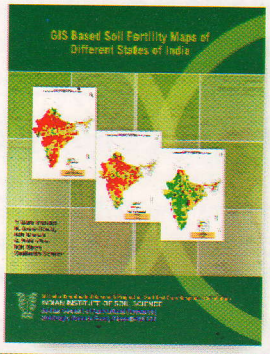
Superannuation

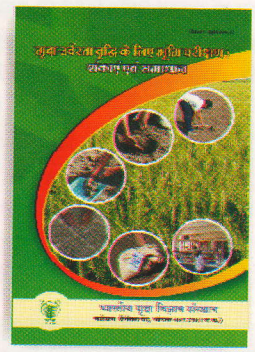
Dr. A. K. Misra, Head, Soil Physics Division and Dr.M.V.Singh, Project Co-ordinator (Micronutrients) superannuated on 31-01-2011 and 31-03-2011, respectively.

Forth Coming Events

- Model Training on "Soil Organic C management for climate resilient agriculture during Nov. 23 to Dec. 2, 2011.
- Model Training on "Best soil and water management practices for resource use efficiency during 17-24 Oct., 2011.
- Model Training on "Green house gas mitigation strategies in agriculture : microbes in aid of global climate change " during 12-19 Dec. 2011.

New Publications





Scientists' Participation in Conference/Seminar/Training/Workshop/Group Discussion

Name	Programme	Venue	Period (Jan-June, 2011)
Dr. J. K. Thakur	National Training on "Metagenomics: Methods and Applications in Microbiology"	NBAIM, Mau, UP.	Jan. 11-20
Dr. A. B. Singh	State level seminar on "Soil Health, Sustainability andFood Security"	BSKVV, Dapoli.	Jan. 21-22
Dr. Asit Mandal	Training programme on Data analysis using SAS under the consortia-based research project "Strengthening statistical computing for NARS"	IASRI, New Delhi	Jan. 31-Feb. 5
Ms. Asha Sahu	Sensitization workshop on "Bioinformatics and Computational Biology in Microbiological Research"	NBAIM, Maunath Bhanjan, UP	Jan. 29-Feb. 4
Dr. A. B. Singh	Madhya Pradesh Agro Technology & Business Fair, Farm Tech-2011	Lal Pared Ground, Bhopal.	Feb. 03-08
Ms. I. Rashmi	Training on "Website Design, Development, Hosting and Management"	IIFM, Bhopal	Feb. 2-4
Dr. A. Subba Rao	10th Agricultural Science Congress on 'Soil, plant and animal health for enhanced and sustained agricultural productivity'	NBFGR, Lucknow	Feb. 10-12
Drs. K. M. Hati, J. Somasundaram, A. Subba Rao	National Seminar on Improving Water Productivity: Limitations and Opportunities".	RVSKVV, Gwalior	Feb. 25-26
Dr. J. K. Thakur	Training on "Role of Scientists in Natural Resources and Environment Management"	IIFM, Bhopal	Feb. 14-18
Dr. A. K. Biswas	ICAR-ZTM-DPD (west zone) meeting cum workshop	CIRCOT, Mumbai	March 11-12
Dr. N. K. Sinha	National seminar on "Restructuring of irrigated agriculture status and strategies"	JNKVV, Jabalpur	March 15-17
Dr. J. K. Thakur	Workshop cum training on "Computational Approaches in Biological Data Mining"	IARI, New Delhi	March 23-25
Dr. A. B. Singh	Workshop on " Project Management for all " organized by PHD Chamber in association with the Ministry of Statistics and Programme Implementation Govt. of India & Project Management Institute of India	Noor-e-Sabha, Bhopal	March 25
Ms. Asha Sahu	Training course on "Current approaches and applications of bioinformatics in agricultural research"	CTCRI, Sreekariyam, Thiruvananthapuram	March 28 - April 6
Drs. Muneshwar Singh & R H Wanjari	Interaction Meeting of DAC project entitled 'GPS and GIS based model soil fertility maps for selected districts of the country'	IISS, Bhopal	April 17-18
Dr. Asit Mandal	GenOk regional course on "Holistic foundations for assessment and regulation of genetic engineering and genetically modified organisms"	CSA, Hyderabad	May 1-7
Drs. Muneshwar Singh & R. H. Wanjari	Attended Consortium Advisory Committee (CAC) Meeting of NAIP sub project entitled 'Assessment of quality and resilience of soils under diverse agro-ecosystems'	IISS, Bhopal	May 15
Dr. M. C. Manna	Workshop on "Global warming and climate change"	EPCO, Bhopal	June 2
Dr. A. Subba Rao	Workshop on "Strategies for enhancing of crop production in Madhya Pradesh"	JNKVV, Jabalpur	June 22-23
Dr. A. Subba Rao	"International Conference on 'Organic Bihar' and launching of brand name 'JaiB' for organic produce of Bihar	ICAR Research Complex for Eastern Region, Patna	June 17-18
Dr. A. Subba Rao	Review meeting of AICRP's of Natural Resource Management Division of ICAR	ICAR, New Delhi	June 25-26
Dr. A. B. Singh	International Conference on Organic Farming and Launching of Bihar Brand Jai B	Patna, Bihar	June 22-24
Drs. M. C. Manna & J. K. Thakur	National workshop entitled "Improving crop productivity under rainfed areas"	IISS, Bhopal.	June 28-29

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