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SALINITY NEWS



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From Directors' Desk



Salinity is essentially a twofold setback to the farmers as excess salts and related constraints like waterlogging not only diminish the crop yields but also necessitate unnecessary expenditure for the land reclamation. Current state of salinization in several parts of India is strikingly different from that of 1970s and 1980s when gypsum application and salt leaching with the fresh water ensured a quick turnaround. The problem has steadily grown into complexity such that a multipronged strategy has become absolutely essential to unlock the potential of severely affected lands while safeguarding the productive soil and water resources from the destructive impacts of salts. As business-as-usual approach of 'flushing the salts out of the system' is increasingly becoming impractical, 'enhanced adaptation to live with the salts' has emerged as the new paradigm in salinity research. Accordingly, there is increased emphasis on developing low-cost, water- and energy-use efficient techniques to enable the farmers to harness consistent dividends from the saline resources while doing away the need for recurring investments.

This issue of Salinity Newsletter provides a glimpse of research and extension activities pursued during period of July-December, 2016. Significant research achievements during this period are: municipal solid waste compost as an amendment for saline-sodic soils, salt and nutrient dynamics in saline water irrigated saline soil, evaluation of rice germplasm and innovative crop establishment techniques for rice-based cropping system in coastal saline areas and integrated management of micronutrient deficiencies in saline soils. A total of 13 pre-Rabi Kisan Goshthis were organized under 'Mera Gaon, Mera Gaurav' programme during this period. The 24th meeting of the ICAR-Regional Committee V was organized at ICAR-IARI, New Delhi during 03-04 October, 2016. Kharif Kisan Mela was organized on 7th October, 2016 in village Budhmor of Patiala district. The 43rd Foundation Day of ASRB, New Delhi was celebrated at ICAR-CSSRI, Karnal on 3rd November 2016. The 132nd birth anniversary of late Dr. Rajendra Prasad was celebrated as 'Agricultural Education Day' on 3rd December, 2016. 'World Soil Health Day' was organized in village Mundri of Kaithal district on 5th December, 2016. An 8-days model training course on 'Quality Seed

Production, Processing and Certification of Selected Field and Vegetable Crops in Salt Affected Area" was organized from 15th-22nd December, 2016.

Some notable visitors to the Institute during this period were Prof. Ramesh Chand, Member, NITI Ayog; Dr. T. Mohapatra, Secretary, DARE and DG, ICAR; Dr. M. Mahadevappa and Prof. R. B. Singh, Former Chairmans, ASRB; Dr. Gurbachan Singh, Chairman, ASRB and Sh. Chhabilendra Roul, Secretary, ICAR. Different distinguished researchers from abroad also visited the Institute for exploring collaborative research areas. While several colleagues got promotions, many others retired after rendering valuable services to the Council. We wish them a happy life ahead. We welcome the suggestions from readers to further improve the contents of the Newsletter.

In This Issue.....

- Municipal Solid Waste Compost: a potential amendment for saline-sodic soils
- Salt and nutrient dynamics in saline water irrigated saline soil
- Promising rice germplasm for flood-prone and saline coastal soils
- Innovative crop establishment methods for rice-based cropping system in coastal salt-affected soils
- Integrated management of zinc and iron deficiencies in mustard in salt affected soils
- Kisan Goshthis and other activities under Mera Gaon Mera Gaurav (MGMG) programme
- Kisan Goshthis under LBS Award project
- Hindi Pakhwara
- 24th meeting of the ICAR-Regional Committee V
- Kharif Kisan Mela
- Swachh Bharat Abhiyan
- 43rd Foundation Day of Agricultural Scientists Recruitment Board
- Agricultural Education Day
- World Soil Health Day
- Model Training Course (MTCs) on Quality Seed Production
- Training on Dairy Management for Livelihood Security
- Notable Visitors

(Parbodh Chander Sharma)

Director

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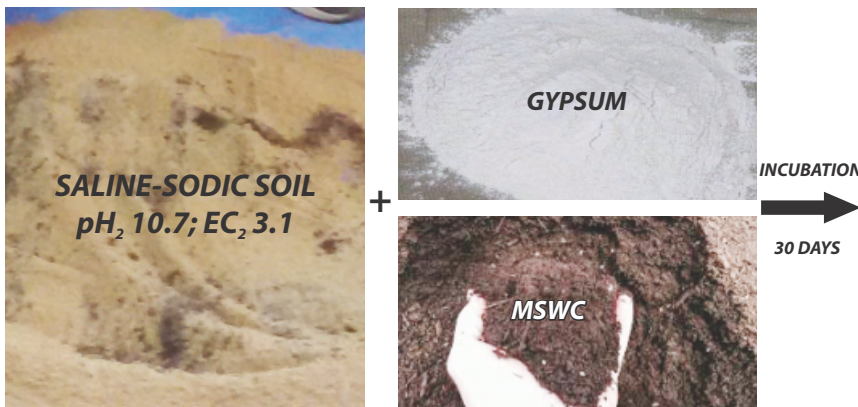
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Municipal Solid Waste Compost: a potential amendment for saline-sodic soils

Competing demands for the use of quality gypsum by other industrial sectors has necessitated the search for alternate amendments for sodic soils. Municipal Solid Waste Compost (MSWC) as conditioner has the potential for improving the physical, chemical and biological properties of the sodic soils. Considering these beneficial effects, the Hon'ble Supreme Court of India has also mandated the application of MSWC to maintain the soil health that may also ensure the safe disposal of this urban waste. Therefore, this study explored the potentiality of MSWC in the reclamation of saline-sodic soil irrigated with high SAR irrigation water. Conventional amendments gypsum (G) viz., GR25 (25% gypsum requirement), GR50 and its combination with 10 and 20 t ha⁻¹ of farmyard manure (F) and MSWC of Karnal (KC) and Delhi (DC) origin were incubated with soil for one month at 60% field capacity. After 30 days of incubation, a soil column leaching experiment was carried out with completely randomized factorial design in triplicate. Columns were

sequentially leached up to ten pore volumes of synthetic saline water having fixed EC_{iw} of 6 dS m⁻¹ with variable SAR of 10 and 15 mmol^{1/2} L^{-1/2}. Nature, quantity and independent integration of amendments had a positive influence as evident from the decrease in soil alkalinity and leaching of salts. Unamended soil had high pH than amended soil. Leaching with saline water released an appreciable quantity of electrolytes from the soil. The ionic balance analysis indicated an increase in Na⁺, Cl⁻, CO₃²⁻ in leachates with increase in SAR while contents of Ca²⁺, Mg²⁺, K⁺, SO₄²⁻ declined and that of HCO₃⁻ did not change. Leaching with different SAR waters had considerable influence on decrease in both pH and EC. Decrease in leachate pH was the maximum with the use of GR₂₅DC₂₀ followed by GR₂₅DC₁₀ and the least in control. Changes in pH and EC showed inverse relation at different soil depths. Among the different combination of amendments, GR₂₅ + DC (20 t ha⁻¹) treated soil showed greatest reduction in both soil pH and EC irrespective of water SAR.



GR₂₅ + MSWC (10-20 t ha⁻¹)



Leaching with 5 & 15 SAR water

An overview of soil amendments, incubation and soil column leaching experiment

Parul Sundha, Arvind K. Rai, Nirmalendu Basak, R.K. Yadav and D.K. Sharma

Salt and nutrient dynamics in saline water irrigated saline soil

Saline soils are often also underlain with saline groundwater leaving little scope for reclamation using fresh water either from rain water harvesting and/or canal water. In many farming situations of arid and semi-arid regions, the scarcity of fresh water has forced farmers to use saline groundwater, which helps to overcome drought and increase crop yields. Assessment of the real time *in situ* electrical conductivity of root zone in saline soil under saline water irrigation can help in developing proper soil-water-crop management practices. Total concentration of dissolved salts in the soil solution usually employed for measurement of soil salinity is empirical in nature and mostly does not match with the electrical conductivity of the soil solution wetting the plant roots. Accordingly, dynamics of electrical conductivity (EC_{ss}) and nutrient concentration in soil solution collected from soil at field capacity after 24 hrs of irrigation using centrifugal filters were studied. Soil samples



Installation of TDR Access tube in soil

were drawn from Nain Experimental Farm, Panipat under sorghum-wheat cropping system since 2014. Soil solution in

quasi-equilibrium with soil solid phase was extracted and analyzed for different cationic and anionic constituents. The EC_{ss} and pH_{ss} were in the range of 3.1-42.05 $dS\ m^{-1}$ and 7.61-8.56, respectively. Dissolved organic carbon (DOC) and total nitrogen in soil solution were in the range of 11.54-476.9 $mg\ L^{-1}$ and 77.81-363.5 $mg\ L^{-1}$. Correlation matrix between different cationic and anionic constituents and their indices were developed. Soil pH_2 was positively correlated ($r > 0.3-0.6$) with soil solution indices like sodium adsorption ratio (SAR), Na^+/K^+ (SPR), $Na^+/(Cl^- + SO_4^{2-})$

(NCSR), Cl^-/SO_4^{2-} (CSR) and $DOC/Ca^{2+}/Mg^{2+}$ (CMR) was negatively correlated with pH_2 . These findings suggest that EC_2 and SAR play important roles in determining the soil pH but at micro-level cationic and anionic ratios also modify the soil pH. Biomass production of the salt tolerant wheat variety KRL-210 was not much affected by different soil solution parameters due to its adaptive mechanisms in the tested range. Whereas, 85.6% variability in DOC content of soil solution was explained by $Ca + Mg$, pH_{ss} , total nitrogen and $Na/(Cl^- + SO_4^{2-})$ ratio.

A. K. Rai, N. Basak, B. Narjari, Parul Sundha, R.K. Yadav, Satyendra Kumar, Gajender, A.K. Bhardwaj, Madhu Chaudhary, Anil R. Chinchmalatpure and D.K. Sharma

Promising rice germplasm for flood-prone and saline coastal soils

Rice germplasm including released varieties and lines from ICAR-CSSRI, IRRI, and local landraces were maintained and evaluated under different land situations (during 2015). Twenty nine ICAR-CSSRI varieties (CSR 1, CSR 2, CSR 4, CSR 8, CSR 10, CSR 12, CSR 13, CSR 14, CSR 16, CSR 20, CSR 21, CSR 22, CSR 23, CSR 25, CSR 26, CSR 27, CSR 28, CSR 29, CSR 31, CSR 32, CSR 33, CSR 34, CSR 35, CSR 36, CSR 37, CSR 38, CSR 39, CSR 40 and CSR 41) were evaluated during *Kharif* 2015. Under semi-deep water situation with stagnant flooding, 25 entries (Gitanjali, Swarna Sub -1, SR 26 - B, Sabita, Patnai- 23, Dinesh, Purnendu, Ambica, Nalini, Manas swarabar, Tilak kanchari, Najani, Sada Mota, CSRC(D)5-2-2-2, CSRC(D)7-0-4, CSRC(D)7-12-1, CSRC(D)13-16-19, CSRC(D)12-8-12, CSRC(D)7-5-4, CSRC(D)2-0-8, CSRC(D)2-17-5, C 300 BD-50-11, Asfal, NC 678 and Gavir saru) were evaluated and the highest grain yield of 4.4 $t\ ha^{-1}$ was recorded in CSRC(D)12-8-12. Twenty two entries (Amal-Mana, Utpala, Sumati, CSR 26B, Dadsal, CST 7-1, Bhutnath, Namita-Dipti, Chamar Mani, Dudheswar, BuckTulsi, CSR 1, CSR 2, CSR 6, Talmugur, Nona Bokra, Pankaj, Pokali, CN 1233-33-9, CN 1231-11-7, CN 1039-



Rice seed production plots

9 and Swarna-Sub 1) were evaluated under low land situation. The highest grain yield of 4.5 $t\ ha^{-1}$ was recorded in Amal-Mana followed by Sumati (4.3 $t\ ha^{-1}$) and Namita-Dipti (4.2 $t\ ha^{-1}$).

Sukanta K. Sarangi and B. Maji

Innovative crop establishment methods for rice-based cropping system in coastal salt-affected soils

Rainfed shallow lowland rice suffers from water stagnation/submergence for 8-10 days or more during initial transplanting stage leading to appreciable damage. However, early sowing of rice by direct seeding before the onset of monsoon helps in better establishment such that crop becomes tolerant to stagnant flooding at a later stage. Also, there is possibility of un-puddled transplanting of rice to reduce the input costs incurred on the use of labour and machinery in puddling as well as to reduce the negative effects of puddling on succeeding *Rabi* crops. Keeping these facts in view, a study was undertaken at Canning Town for increasing the cropping intensity through better crop establishment of rice and *Rabi* crops in the rice-fallow areas. The experiment consisted of three methods of *kharif* rice establishment [dry direct seeding (DSR), un-puddled transplanting (NUPT) and puddle transplanting (PT)] in main plot, three methods of *rabi* crop establishment (direct sowing after harvest of rice, sowing with normal land preparation and raised



Gap filling in transplanted plot due to mortality of seedlings as a result of flooding by heavy rain in July

bed/ridge sowing) in sub-plot and two *rabi* crops (rapeseed and maize) in sub-sub plot. During *Kharif* season of 2015, total rainfall

during July month was 834 mm, *i.e.*, 224% higher than 49 years average rainfall of 372 mm for the month of July. Due to very heavy rain, transplanted crop was severely affected by flooding during the initial 3 weeks after transplanting, but the direct seeded crop was not affected as the canopy height was sufficiently above the field water depth. DSR crop exhibited higher greenness (NDVI value) and net photosynthesis than both UNPT and PT crops. Though both UNPT and PT treatments were affected due to initial flooding, damage was relatively lesser in UNPT crop than PT which may be due to better soil properties in the former than later. Root

length was higher in DSR plants as it established in a dry situation, and adapted its morphology accordingly. There was non-significant variation in yield with different treatments except in case of straw yield during third year, which was significantly higher in DSR over puddled transplanted rice. However, when the treatments were evaluated in terms of economics, net return and B: C ratio were higher in DSR than other treatments. Cost of cultivation was 20 and 47% more in PT than UNPT and DSR respectively. Net return was 40 and 50% more in DSR than UNPT and PT, respectively.

Sukanta Kumar Sarangi, Uttam Kumar Mandal and Subhasis Mandal

Integrated management of zinc and iron deficiencies in mustard in salt affected soils

Considering the fact that micronutrient deficiencies; especially those of Zn and Fe, are a major cause of low productivity of pearl millet and mustard crops in saline soils, a field experiment was conducted at Nain Experimental Farm, Panipat to optimize Zn and Fe requirements of pearl millet-mustard crop rotation. As per treatments schedule, zinc and iron were applied through soil in the form of $ZnSO_4 \cdot 7H_2O$ and $FeSO_4 \cdot 7H_2O$, respectively, at the time of sowing of both mustard and pearl millet. Foliar sprays of respective nutrients were also applied with same chemicals as in soil application at 30 and 45 days after sowing. Among 12 different treatments, only one treatment was with FYM besides application of 5 kg Zn + 10 kg Fe. It was implemented for pearl millet crop only. In case of mustard, same treatment without FYM was implemented. Initial soil EC_e and pH_5 (0-15 cm depth) were 10.7 $ds\ m^{-1}$ and 8.45, respectively. Soil application of 12.5 kg Fe ha^{-1} alone significantly decreased Na^+ (32%) and Cl^- (28%) contents in mustard leaves at flowering stage over control. Foliar application of 0.5 % $ZnSO_4$ + 1% $FeSO_4$ twice was equally effective in increasing the mustard yield similar to soil application of 5 kg Zn and 7.5 kg Fe ha^{-1} . The highest seed yield of mustard (2.26 t ha^{-1}) was obtained with the use of 5kg Zn, 10 kg Fe and 10 t FYM ha^{-1} . Results also indicated that combined soil application of 5 kg Zn+ 10 kg Fe +10 t FYM ha^{-1} was useful to maintain



Performance of mustard in combined Zn and Fe along with FYM application

significantly highest DTPA-extractable Zn (0.84 $mg\ kg^{-1}$) and Fe (5.93 $mg\ kg^{-1}$) in saline soils at harvest of mustard. Results also revealed that combined application of 5 kg Zn+10 kg Fe + 10 t FYM ha^{-1} significantly improved organic carbon, N, P and K status in surface soil by 54.5, 55.8, 35.7 and 26.3%, respectively, over control. The average EC_e values of soils were 6.5 and 10.7 $dS\ m^{-1}$ at 0-15 cm, 8.7 and 7.6 $dS\ m^{-1}$ at 90-120 cm depth, under combined application of 5 kg Zn+ 10 kg Fe +10 t FYM ha^{-1} and control treatment, respectively. In conclusion, combined soil application of Zn, Fe and FYM decreased soil salinity, enhanced availability of micronutrients and increased mustard yield. Combined foliar application of Zn and Fe was also superior over the spray of a single nutrient.

B.L. Meena, R.L. Meena, Parveen Kumar, Ashwani Kumar and M.J. Kaledhonkar

Kisan Gosthis and other activities under Mera Gaon Mera Gaurav (MGMG) programme

Mera Gaon Mera Gaurav (MGMG) programme, initiated by Indian Council of Agricultural Research, New Delhi is being implemented by ICAR- Central Soil Salinity Research Institute, Karnal and its Regional Research Stations at Lucknow, Bharuch and Canning Town since May, 2015. Thirteen pre-Rabi Kisan Gosthis were organized under this programme in which 1587 farmers participated and benefitted by interacting with the subject matter specialists. Detailed discussion on package of practices for major Rabi crops in the respective states was the main theme of discussion in these meetings. The farmers were sensitized about the salt tolerant varieties of rice, wheat, mustard and chickpea crops and other technologies developed by the Institute and were



Pre-Rabi Kisan Gosthis in salinity affected villages under MGMT

advised to adopt these technologies for higher incomes from the salt affected soils. Farmers were also sensitized about appropriate techniques and remedial measures to enhance the crop and milk productivity. Soil and water samples were also collected from the

farmers for free-of-cost testing. During this period, MGGM teams conducted 52 visits to different villages and contacted 1371 farmers. These teams also provided 450 mobile advisory services benefitting 660 farmers in the adopted villages. Literatures on 21

different aspects of reclamation and management of salt affected soils were also distributed among 1653 farmers. A total of 256 front line demonstrations on salt tolerant varieties were conducted in different villages during this period.

Kisan Goshthis under LBS Award project

A Kisan Gosthi was organized in Sikander Kheri village of Kaithal district at farmers' field on 12th August, 2016 with aim to enhance the farmers' knowledge and creativity for sustainable crop production under climate change. Farmers from Hisar district and neighbouring villages interacted with Sh. Rajesh Kumar, a



A glimpse of Kisan Gosthi at Sikander Kheri

progressive farmer who has pioneered organic vegetable cultivation in partially reclaimed sodic soils using vermi-compost and organic pesticides. In addition to vegetables, he also grows guar, cotton, wheat and mustard crops. Two Kisan Gosthis were also organized in sodicity affected Chakwa and Hasanpur villages of Jaunpur district on 24th September, 2016 during which scientists and local KVK experts interacted with about 160 farmers and suggested solutions to their varied problems. Similarly, two Kisan Gosthis were organized in the salinity affected Chidaud and Bhatol Jatan villages of Hisar district during 08-09 November, 2016. The main objective of these gosthis was to understand the compounded impacts of salinity, climate change and socio-economic changes on livelihood security of the farmers. Considering the fact that salinity in soil and water is a major problem, efforts have been made to provide the selected farmers in these villages the seeds of salt tolerant rice (Basmati CSR 30, CSR 43), wheat (KRL 210) and mustard crops (CS 54 and CS 56) capable of giving stable yields under saline conditions.

Hindi Pakhwara

The Institute celebrated the Hindi Pakhwara during September 14-29, 2016. Dr. A.K. Srivastava, Director and VC, ICAR-NDRI, Karnal inaugurated the function on 14th September, 2015. On this occasion, he asked the gathering to use Hindi in official work. During the whole event, different competitions such as Tatkal Bhashan, Tippani Aalekhan, Aavedan Patra lekhan, Computer mein hindi typing, Tippani evam masauda lekhan, Prashanotri Pratiyogita and Takniki Poster Pradarshani were organized. In the valedictory function, Dr. P.C. Sharma, Director ICAR-CSSRI, Karnal advised the scientists of the institute to make use of Hindi language in brining out the scientific and technical literature to benefit the farmers.



Dr. A.K Srivastava, Director and Vice-chancellor ICAR-NDRI, addressing the gathering during Hindi Pakhwara

24th Meeting of the ICAR-Regional Committee V



Regional Committee Meeting in progress

The XXIV meeting of the ICAR-Regional Committee V was organized at ICAR-IARI, New Delhi during 03-04 October, 2016 under the Chairmanship of Dr. Trilochan Mohapatra, Secretary, DARE and Director General, ICAR, New Delhi to discuss viable techniques and measures for sustaining agricultural production in the states of Punjab, Haryana and Delhi. A total of 103 delegates including officials from DARE, members of ICAR Governing Body, representatives of Punjab, Haryana and Delhi Governments, Vice Chancellors of State Agricultural Universities, Deputy Director Generals of ICAR and Directors of ICAR Institutes were present. Dr. H. Rahman, DDG (AS), ICAR and Nodal Officer, Regional Committee V appreciated the contributions of Punjab and Haryana states in making India self-reliant in food

availability. He drew attention to the problems of secondary salinity and rampant natural resource degradation in the south-western parts of Punjab and Haryana. Dr. Trilochan Mohapatra Secretary (DARE) and DG (ICAR), in his inaugural address, mentioned the massive contribution of Punjab and Haryana states in national food security. He said that serious challenges such as relentless land degradation, climate variability, salinization and water depletion have created formidable stumbling blocks to the sustainable agricultural development in the region. He urged that researchers and policy makers need to give immediate attention to the issues related to climate change, excessive use of the nitrogenous fertilizers, secondary salinity,

deterioration in soil health, micronutrient deficiencies, groundwater decline, rice straw burning, erosion of crop and animal genetic resources and insecticide resistance. He suggested that the strengths of livestock and fishery sectors need to be harnessed to gradually move away from crop based agriculture to farm diversification. This was followed by detailed discussions on state-specific problems in agriculture, horticulture, dairy management, farm mechanization, fishery, etc. and the future strategies to overcome these problems for sustainable and higher farm incomes. The session ended with a vote of thanks proposed by Dr. P. C. Sharma, Member Secretary, ICAR Regional Committee V and Director, ICAR-CSSRI, Karnal.

Kharif Kisan Mela

A *Kharif Kisan Mela* was organized on 7th October, 2016 in village Budhmor of Patiala district (Punjab). *Kisan Mela* was inaugurated by the Chief Guest Dr. R. S. Gandhi, ADG (AS), ICAR, New Delhi while Dr. P. C. Sharma, Director, ICAR-CSSRI, Karnal presided over the function. Dr. Gandhi appreciated the efforts being made by the ICAR-CSSRI in the transfer of salinity management technologies immensely benefitting the farmers in the salinity affected areas. He advised the farmers to have a close contact with the scientist so that they could smoothly adopt the technologies developed by the various organizations located in the area. He also stressed that the farmers should adopt those technologies which give more profit with less investments. Dr. P. C. Sharma emphasized that farmers should adopt salt tolerant

varieties of wheat and mustard developed by ICAR-CSSRI. He also advised the farmers to stop crop residue burning and apply more organic inputs such as FYM and green manures to crops for sustaining the soil health. A '*Farmer-Scientist Interaction Workshop*' was also organized during the *Kisan Mela* in which Subject Matter Specialists suggested solutions of the problems raised by the farmers. A total of 100 soil and water samples brought by the farmers were also tested free of cost and the test reports were simultaneously issued. Seeds of salt tolerant wheat (KRL 210 and KRL 213) and mustard (CS 52, CS 54 and CS 56) were also sold. About 500 farmers, farm women and extension workers were present. Dr. Ranjay K. Singh acted as the Nodal Officer of the Mela.



Dr. R.S. Gandhi, ADG (AS), addressing the farmers



Swachh Bharat Abhiyan

A number of programmes were organized on *Swachh Bharat Abhiyan* in different villages viz; Bhudmor (Patiala), Sampli Kheri and Sikander Kheri (Kaithal), Zarifa Viran (Karnal) and at the Main Campus and Regional Stations of the Institute during the period under report. In these programmes, villagers, farmers and school children were sensitized about importance of cleanliness, advantages of composting of the farm and domestic waste, climate change adaptation, etc. They were motivated for maintaining cleanliness in homes, surroundings and community lands for health benefits. Competitions among school children on



Glimpses of Swachh Bharat Abhiyan

environmental issues such as soil and water health, agrobiodiversity conservation, local cultural traditions and livelihoods were also organised during this programme. Children and farmers were briefed about the value of rice residue incorporation/ retention for enhancing the soil organic matter and microbial activity as well as for reducing the environmental impact of burning. In this series, a seminar on 'Swachhta, Samgatishilta and Paryawaran' was also organized at ICAR-

CSSRI, Karnal on 28th October, 2016 during which about 100 farmers and scientists were present. Sh. Aditya Dahiya, Commissioner, MC, Karnal was the Chief Guest on this occasion. Safe disposal of solid waste, prevention of crop residue burning, methodology for compost preparation using the farm waste, kitchen gardening using home grown organic inputs and use of solar power in homes and offices were the major issues discussed during this seminar.

43rd Foundation Day of Agricultural Scientists Recruitment Board

ASRB, New Delhi organized its 43rd Foundation Day at ICAR-CSSRI, Karnal on 3rd November 2016. Dr. Gurbachan Singh, Chairman, ASRB presented the ASRB Report highlighting the significant achievements and the new initiatives. He said that ASRB has gradually moved away from the written to the computer based test for preliminary examination.

Chief Guest Prof. Ramesh Chand appreciated the glorious achievements of ASRB. He said that besides conventional responsibilities of recruitment and selection, the role of ASRB has significantly expanded recently as it now also recruits administrative and technical staff for ICAR. Dr. T. Mohapatra, Secretary, DARE and DG, ICAR complimented ASRB for its

illustrious journey of 42 years. Dr. M. Mahadevappa, Former Chairman, ASRB expressed concern over the mushrooming of private colleges/universities offering agricultural degrees without appropriate quality checks which are likely to deteriorate the quality of agricultural education in the country. Prof. R. B. Singh, Former Chairman, ASRB noted that consistent reforms are the key to the lasting relevance of an organization and urged the ASRB to be always receptive to the reforms. Sh. Chhabilendra Roul, Additional Secretary, DARE said that continued improvements must be the intrinsic components of the efforts by ASRB with respect to talent search.



A glimpse of ASRB Foundation Day

Agricultural Education Day

The 132nd birth anniversary of late Dr. Rajender Prasad, the First President of India, was celebrated as 'Agricultural Education Day' on 3rd December, 2016. On this occasion, 64 students and teachers of the Government Senior Secondary School, Dabri (Karnal) and ICAR-CSSRI staff were present. At the outset, Dr. P. C. Sharma, Director welcomed the students and explained the importance of Agricultural Education Day. He appraised the students about the challenges and employment opportunities in the field of agriculture. He also informed the gathering about the past achievements and current efforts to enhance the standard of living of the resource poor farmers by technology-led improvements in crop productivity in salt-affected areas. On this occasion, a 'Scientist-Student Interaction Meeting' was also organized during which scientists replied to the students' queries related to soil and water management. An exposure visit of school children to different research experiments, Herbal Garden and the Institute Museum was also arranged.



Dr. P.C. Sharma, Director, CSSRI with school children

World Soil Health Day

'World Soil Health Day' was organized in Mundri village of Kaithal district on 5th December, 2016. Dr. V.P. Chahal, ADG (KVK), ICAR, New Delhi was the Chief Guest while Dr. P. C. Sharma, Director, ICAR-CSSRI, Karnal presided over the function. About 200 farmers, extension personnel and IFFCO officers were present. Dr. Chahal requested the farmers for maintaining soil health for better crop productivity. Dr. Sharma highlighted the importance of soil health and the approaches, *inter alia*, residue incorporation, integrated nutrient management and efficient water management to sustain it. On this occasion, 25 soil health cards and 50 IFFCO Green SIM cards were distributed among the farmers.



Dr. V.P. Chahal distributing the soil health card to the farmer

Model Training Course (MTCs) on Quality Seed Production

A 8-days model training course on 'Quality Seed Production,



Dr. G.P. Singh, Director, ICAR-IIWR, addressing the trainees

Processing and Certification of Selected Field and Vegetable Crops in Salt Affected Areas" was organized from 15-22 December, 2016. A total of 29 participants from line department, KVKs and ICAR institutes representing 4 states attended the training. Chief Guest of the valedictory function Dr. G.P. Singh, Director, ICAR-IIWBR, Karnal emphasized the importance of the use of quality seed and increase in the seed replacement ratio. He also discussed IPR issues, farmers right and importance of seed act 2006 in the changing scenario. Dr. P.C. Sharma, Director, ICAR-CSSRI, Karnal highlighted different technologies developed by the ICAR-CSSRI and requested the participants to provide quality seeds to the farmers for higher farm profits.

Training on Dairy Management for Livelihood Security

A 3-days training programme on 'Dairy Management for Livelihood Security' was organized under Farmers FIRST Project during 27-29 December, 2016 which was attended by 30 farmers of Kaithal district. Chief Guest Dr. Gurbachan Singh, Chairman, ASRB, New Delhi advised the farmers to adopt multi-enterprise agriculture model for livelihood security. He advised the farmers to use crop residues for composting. Dr. P.C. Sharma, Director, briefed about institute's achievements & shared his ideas about how integration of salt tolerant varieties can minimize the risks of crop failures in sodic agroecosystems.



Dr. Gurbachan Singh, Chairman, ASRB, addressing the farmers

Notable Visitors



Dr. Gurbachan Singh, Chairman, ASRB, New Delhi and Dr. J.S. Samra, Ex CEO, NRAA, New Delhi discussing about institute technologies with Dr. P.C. Sharma, Director, ICAR-CSSRI, Karnal and other staff on 4th November, 2016.

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