



From the Director's Desk

Viable options for sustaining Indian sugar industry

Sugar is an important commodity in the global market and any fluctuation in the prices of this produce is bound to have an impact world-wide. The world sugar prices have been down by 4 % since the start of 2014 (over 15 % down since 2013) and are expected to remain so for the time being. The bumper sugar production by the sugar producing countries has led to a drop in sugar prices. The fall in global crude oil prices has resulted in the Brazilian sugar mills diverting less cane towards ethanol production, with more sugar being produced. This glut has crashed the international prices of this sweetener. This is bound to have a significant effect on the sugar production scenario of the major sugar producing countries. India is no exception, with the steep slide in international sugar prices set to take a toll on the sugar industry.

What is the way out for the industry to survive this tumultuous period ? A key solution to remain economically viable can be through diversification to other products like ethanol, co-generation, bio-organics like bio-plastics, paper, pulp etc. Many of the sugar mills have already moved towards

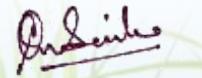
diversification, with more than 160 of the 513 operational sugar mills affiliated with distilleries and 210 mills exporting electricity. With the National Policy on Biofuels of the Government, a target for 20% blending of biofuel with the automobile fuel has been proposed by 2017, with 5% blending already operational. To meet the combined demand of blending and other uses, the country will have to produce approximately 10,000 million litres of ethanol, with a share of the total sugarcane produced being diverted towards ethanol production.

Second generation (2G) ethanol production needs to be intensified in times to come. The availability of vast agricultural residues like sugarcane trash and bagasse as a non-food feed stock presents an excellent opportunity for India to produce 2G ethanol. According to Bloomberg Energy Finance Report, by 2020, theoretically India will be in a position to produce 30-50 billion litres of 2G ethanol annually, with the available biomass residue levels. The lignin extracted during the process can also be used to meet a part of the energy needs. Sugar factories can successfully take up 2G ethanol production from surplus bagasse and crop residue as feed stock. There are many challenges in cellulosic ethanol production process like effective defragmentation of cellulose and hemicelluloses from lignin, depolymerisation of cellulose to monomeric sugars and its subsequent conversion to bioethanol. Identification of suitable microbes for conversion of cellulose to sugars, development of genetically engineered ethanol producing microorganisms with the ability to grow on cellulose and to convert it into sugars, identification/development of microorganisms which can convert cellulosic biomass directly to ethanol etc. are some of the other researchable areas.

Co-generation of electricity by sugar mills can also add to the profitability of sugar mills. The current installed capacity for power by the sugar mills is about 2500 MW with a potential of approximately 5000 MW. Thus there is a huge untapped potential in this area also, making green energy from sugarcane a viable option for the industry to tide over the difficult times. Intensive research on development of energy canes/energy plantations with a proper proportion of juice brix and fibre and related management issues need to be taken up.

Thus there is ample scope for additional revenue generation for the sugar mills, to surmount the pressure of lower prices of sugar in global market. These issues need to be addressed effectively, with an intensification of R&D efforts. Keeping up with the times, IISR will have to equip itself to provide viable solutions to these problems faced by the farmers and sugar mills, thereby aiding in making the sugar industry as well as sugarcane cultivation economically viable.

- वर्ष 2014 के शुरूआत से अब तक विश्व स्तर पर चीनी मूल्य में 4 प्रतिशत की कमी आई है और आगे भी चीनी मूल्य में गिरावट बने रहने की आशंका है।
- गिरते चीनी मूल्य के कारण चीनी उद्योग के समक्ष आर्थिक अस्थिरता का खतरा उत्पन्न हो गया है।
- उत्पाद विविधीकरण जैसे चीनी के साथ-साथ द्वितीय पीढ़ी (2G) इथेनॉल, बिजली, प्रेसमड, पेपर, पल्प इत्यादि के द्वारा चीनी उद्योग की आर्थिक स्थिति सुदृढ़ की जा सकती है।
- चीनी मिल में आवश्यकता से अधिक उपलब्ध फसल अवशेष (गन्ने की सूखी पत्तियाँ तथा खोई) 2G इथेनॉल उत्पादन में उत्कृष्ट अवसर प्रदान कर सकता है। एक अनुमान के अनुसार सन् 2020 तक 30-50 बिलियन लीटर 2G इथेनॉल का उत्पादन भारत कर कसने में सक्षम हो सकता है।
- देश की कार्यरत चीनी मिलों में स्थापित बिजली उत्पादन क्षमता लगभग 2500 मेगावाट है जिसे बढ़ाकर 5000 मेगावाट करने की प्रबल संभावना है।



(O.K. Sinha)

22nd Meeting of ICAR Regional Committee held at IISR

Shri Narendra Singh, Minister of Agriculture, Government of Bihar inaugurated the 22nd Meeting of ICAR Regional Committee-IV held at ICAR-Indian Institute of Sugarcane Research, Lucknow from September 5-6, 2014. In his inaugural address hon'ble Minister highlighted the importance of agricultural research for the growth of Indian economy and advocated for adequate enhancement in the budget of ICAR for creation of research infrastructure and manpower to cater to the needs of each and every farmer. Shri Baidyanath Sahni, Minister of Animal and Fish Resources, Govt. of Bihar emphasised on the need of developing diagnostic kits for detection of diseases among the cattle. Shri P.K. Shahi, Minister of State for Environment and Forest, Govt. of Bihar informed about the various steps taken by the Govt. of Bihar for sustainable agriculture and sugarcane development in the state.

In his Presidential address, Dr. S. Ayyappan, Secretary, DARE and Director General, ICAR said that agriculture needs a big push through technological interventions and technology transfer efforts, for which ICAR is strongly committed. He emphasized on multi -faceted growth in agriculture sector and exhorted the participants to utilize the multiple platforms to identify areas of regional importance in agriculture and deliberate over for setting priorities and develop road map for agricultural development in the states of Uttar Pradesh, Bihar and Jharkhand. Dr. S.K. Dutta, Deputy Director General (Crop Science), ICAR welcomed the dignitaries and participants and highlighted the role of biotechnological interventions in crops and livestock for enhancing productivity in the region. Shri V.N. Garg, Agriculture Production Commissioner, Govt. of UP expressed his concern over declining average land holding of the farmers of this region and urged the scientists to develop high yielding varieties tolerant to the aberrant weather conditions.

Five publications viz., Status of Centre State Coordination in Agricultural Research, Education and Extension published by IVRI, Bareilly; Farmers' Guide to Sugarcane Cultivation and Technorama: IISR by IISR, Lucknow, Potential Agroforestry Systems for Jharkhand by NRC on Agroforestry, Jhansi and KVKS in Accelerated Growth of Agriculture in Bihar and Jharkhand published by ICAR Zonal Project Directorate (Zone II), Kolkata were also released. In the inaugural ceremony 17 innovative and progressive farmers of the region were honoured with recognition award. Dr. R.K. Singh, Director, IVRI, Bareilly and Member Secretary of the meeting proposed vote of thanks. The meeting was attended by over 150 delegates including functionaries of agricultural institutions including DDGs and ADGs of ICAR, Vice Chancellors and Directors of the SAUs, Directors of ICAR research institutes, senior officials of state line departments and progressive farmers from Uttar Pradesh, Bihar and Jharkhand.

- भारतीय कृषि अनुसंधान परिषद के क्षेत्रीय समिति-IV की 22वीं बैठक का उद्घाटन श्री नरेन्द्र सिंह, माननीय कृषि मंत्री, बिहार सरकार के द्वारा संस्थान के प्रेक्षागृह में किया गया।
- बिहार सरकार के मंत्री श्री वैद्यनाथ साहनी तथा श्री पी.के. शाही, विशिष्ट अतिथि थे।
- कृषि अनुसंधान एवं शिक्षा विभाग, भारत सरकार के सचिव तथा भा.कृ.अनु.प. के महानिदेशक डॉ. एस. अय्यर्पन ने बैठक की अध्यक्षता की। परिषद के उप महानिदेशक डॉ. एस.के. दत्ता भी मौजूद रहे।
- कृषि शोध संस्थानों, कृषि विश्व विद्यालयों, राज्यों के कृषि विभागों के उच्च अधिकारियों के साथ-साथ प्रगतिशील किसानों ने बैठक में सहभागिता की।
- विभिन्न फसलों, बागवानी, पशु पालन तथा मतस्य उत्पादन के क्षेत्र में उत्पादकता का कीर्तिमान स्थापित करने के लिए 17 प्रगतिशील किसानों को सम्मानित किया गया।



SECTORAL NEWS: SUGARCANE AND SUGAR INDUSTRY

30th Biennial Workshop of AICRP on Sugarcane

The 30th Biennial Workshop of All India Coordinated Research Project on Sugarcane was organized by the ICAR-Indian Institute of Sugarcane Research, Lucknow on November 1 & 2, 2014. The Opening Session was held under the chairmanship of Dr. N. Gopalakrishnan, ADG (CC), ICAR, New Delhi. On this occasion, Shri K.K. Gupta, Chief General Manager, NABARD, Lucknow was the Chief Guest. Dr. S. Solomon, Director, ICAR-IISR, Lucknow welcomed the participants. He remarked that despite increasing population of the country coupled with associated challenges in sugarcane cultivation and marketing, a target sugar production of about 36 million tonnes, with sugarcane production of about 600 mt, cane productivity of about 100 t/ha and sugar recovery of 11% is to be achieved by 2030. Dr Bakshi Ram, Director, ICAR-



SBI, Coimbatore in his introductory remarks highlighted the importance of sugarcane varieties and mentioned that more than 600 varieties have been developed during last eight decades, but only 30-35 varieties were adopted by the farmers. He laid emphasis on the need to change the varietal adoption scenario by developing smart cane varieties based on emerging demand for high tonnage, sugar and fibre. Dr. O.K. Sinha, Project Coordinator (Sugarcane) presented the Annual Progress Report of AICRP on Sugarcane for the year 2013-14 under Crop Improvement, Crop Production, Plant Pathology and Entomology disciplines.

Dr. N. Gopalakrishnan, ADG (CC), ICAR expressed his satisfaction on the research work being undertaken by ICAR-IISR, Lucknow, ICAR-SBI, Coimbatore and AICRP on Sugarcane. He desired that biotechnological tools may be utilized for managing diseases and insect-pests in a more effective manner. He remarked that now there is a need to develop climate resilient varieties and suitable cultivation package in view of change in climate.

Salient Achievements

To facilitate mechanical harvesting in sugarcane and maintain cane yield level, plant geometry with wider row spacing of 120 cm or 30:150 cm is recommended for tropical zone. However, in sub-tropical zone, sugarcane planting at 30:120 cm is an option to facilitate mechanization.

For management of rust disease, Propineb (0.2%) or Mancozeb (0.3%) was found effective when sprayed on the appearance of rust pustules on leaves followed by two sprays at 15-day interval.

Sett treatment with Imidacloprid 70 WG/ SP @ 25g a.i./ha or Thiamethoxam 70 WG/ SP @ 25g a.i./ha followed by spraying of Imidacloprid 17.8 SL 0.005 % at the time of cane formation for the management of sugarcane mealy bug.

- अखिल भारतीय गन्ना शोध समन्वित परियोजना की 30वीं द्वैवर्षिक बैठक का आयोजन संस्थान में नवम्बर 01-02, 2014 को किया गया।
- देश के उष्ण क्षेत्रों में यांत्रिक गन्ना कटाई को बढ़ावा देने तथा उच्च गन्ना उपज स्तर को बरकरार रखने के लिए 120 सेंमी. या 30:150 सेंमी. पौध ज्यामिति में गन्ना बुआई संस्तुत की गई। उपोष्ण क्षेत्रों में यांत्रिक गन्ना कटाई के लिए 30:120 सेंमी. पौध ज्यामिति संस्तुत की गई।
- गेरुआ रोग के प्रबंधन में प्रोपिनेब (0.2%) या मैकोजेब (0.3%) घोल का गन्ना पत्तियों पर छिड़काव तथा इसके बाद 15 दिनों के अन्तराल पर पुनः दो छिड़काव प्रभावी पाया गया।

Salient research achievements

- Based on the experiments initiated at Shamli (UP) on farmer's field, application of GA₃ on late planted cane showed increased internode length and plant height. This has resulted in an increase in cane yield by >25% over control.



- Profiles of 468 district of 23 states of India have been developed using Database Management technique.

Union Minister of Agriculture Reviewed On-going Research

Hon'ble Union Minister of Agriculture and Food Processing Industries, Government of India, Shri Radha Mohan Singh Ji, visited ICAR-Indian Institute of Sugarcane Research, Lucknow on November 09, 2014. During his visit, Hon'ble Minister reviewed the on-going research and critically observed sugarcane technology in the demonstration plots. Dr. S. Solomon, Director, IISR presented a brief account of the IISR technologies and efforts being made by the Institute for the well-being of sugarcane farmers and sugar industry.

Hon'ble Minister addressed scientists, staff, academicians and administrative personnel of IISR, NBFGR, CISH,

CSSRI RS, IIPR, KVKs and CSAU&T, Kanpur. He appealed to all scientists to adopt one village each in order to intensify work in villages for faster adoption of agricultural technologies by the farmers. The Minister also addressed a press briefing session organised by Dr. A. K. Sah, Media In-charge, ICAR-IISR in which about 15 reporters from electronic and print media participated.

Hon'ble Minister stressed upon strengthening of infrastructure in each and every KVK of the State, while reviewing the progress of KVKs. He also visited the demonstration farm of the institute to closely observe and review the progress made by IISR in developing remunerative cane cultivation technologies.



Impact analysis is a must to make agriculture more visible and vibrant

A consultation workshop on Impact Analysis of Agricultural Research, Education and Extension in Uttar Pradesh was organised at ICAR-IISR, Lucknow on September 20, 2014. The inaugural session of the workshop was chaired by Dr. S. Solomon, Director, IISR and Dr. M. D. Pathak, Ex. DG, UPCAR was the chief guest. While delivering Chairman remarks, Dr. Solomon said that all R&D projects funded by public money must be audited for analysing impact derived under such projects. Proper and transparent impact analysis of institutions and projects

funded by UP Council of Agricultural Research will make agricultural scenario in Uttar Pradesh more visible and vibrant.

This workshop was organized jointly by the NGOs Agri-innovation Foundation, Participatory Rural Development Foundation and ICAR-IISR. Dr. P.S. Pathak, Ex. Director, NRCAF; Dr. S.C. Midget, Ex-VC, GBUAT; Dr. A.K. Singh, ADG (Extension), ICAR; Dr. H. Ravi Shanker, Director, CISH; Dr. R.C. Choudhry, President PRDF were eminent speakers in this workshop. While giving remarks on impact of IISR technology, Dr. A. K. Sah, Principal Scientist said that sugarcane research and development projects implemented by IISR, Lucknow are continuously being evaluated by the stakeholders of the sugar industry. Achievements of IISR were applauded in the past by the industry, higher officials and farmers of the country.



- कृषि व विशेषकर गन्ना क्षेत्र में चलाये जा रहे विभिन्न शोध एवं विकास परियोजनाओं में पारदर्शिता लाकर परियोजनाओं में खर्च किये जा रहे जन-मानस धन की प्रभावी उपयोगिता को सुनिश्चित किया जा सकता है।
- वैज्ञानिकों को अधिक से अधिक समय शोध प्रक्षेत्रों पर देना चाहिए जिससे उनके द्वारा किये गये शोध के फलस्वरूप विकसित तकनीक अधिक टिकाऊ तथा फायदेमंद हो।
- उपकार द्वारा वित्त पोषित शोध परियोजनाओं का प्रभाव ऑकलन वास्तव में प्रदेश में कृषि को और अधिक गतिशील तथा आकर्षक बनाएगा।

STEP FORWARD FOR THE WELL-BEING OF SUGARCANE & SUGAR SECTOR

Reducing cost of cane cultivation and sugar production in UP

One day brain-storming session on “Reducing cost of cane cultivation *vis-à-vis* sugar production: A growing concern of Indian sugar industry” was organized at the Institute by National Academy of Agricultural Sciences (NAAS) Northern Chapter, Lucknow on December 29, 2014. Various innovative options to reduce the cost of cane cultivation especially in sub-tropical part of the country was discussed in detail by the participating NAAS fellows and scientists of the Institute. Director, IISR, Lucknow highlighted the agro-techniques developed at IISR to reduce the cost of cane cultivation and sugar production. Techniques like new planting materials, application of bio-fertilizers, bio-control measures, high yielding new cane varieties, quality cane seed and mechanization of sugarcane planting & harvesting were discussed in detail. Dr. Subodh Yadav, IAS, Commissioner of Agriculture, Govt. of Karnataka presented in brief the present status of cane cultivation and harvesting in Karnataka state. The discussions revealed that the techniques and technologies developed at IISR, Lucknow can reduce the cost of cane cultivation by 25-30%. Dr. Amresh Chandra, HOD, Plant Physiology and Biochemistry was the organizing secretary of the meet.



- राष्ट्रीय कृषि विज्ञान अकादमी उत्तरी चैप्टर द्वारा भारतीय गन्ना अनुसंधान संरथान, लखनऊ परिसर में गन्ने की खेती में लागत कम करने हेतु विभिन्न नवोन्मेषी विकल्पों पर विचार-विमर्श हेतु एक दिवसीय बैठक आयोजित की गई।
- इस बैठक में गन्ने की खेती में लागत कम करने हेतु बुवाई की नवीन विधियों, जैव उर्वरकों का प्रयोग, जैव नियंत्रण विधियाँ, नवीनतम विकसित उन्नत किसिं के गुणवत्तापूर्ण बीज उत्पादन तथा गन्ने की बुवाई व गन्ने की कटाई के यंत्रीकरण जैसी विभिन्न तकनीकों पर गहन विचार-विमर्श किया गया।
- भा.ग.अनु.सं., लखनऊ द्वारा विकसित उन्नत गन्ना उत्पादन प्रौद्योगिकी को अपनाकर गन्ने की उत्पादन लागत में 25-30 प्रतिशत तक की कमी लाई जा सकती है।

Soil Health Management is a Must to Improve Crop Productivity

Every living organism in the world takes rest for a while on certain interval, but it is the soil which never sleeps and continuously provide all essential nutrition to crop for growth & development. Now soil health as well as fertility is in crisis, urgent intervention is needed to address this, otherwise it will be too late to protect & sustain productivity of crops. With this concern a Model Training Course on Integrated Nutrient Management for Improving Soil Fertility & Crop Productivity was organised in the Institute from October 13-20, 2014.

Organic carbon has decreased to an alarming level of 0.25% in some pockets, which is a matter of great concern. Farmers need to be educated on application of organic matter, bio-fertilizer, green manure and crop residues along with inorganic fertilizers. Development officials of state governments should be trained in advance techniques of soil health management and they should implement campaign for large scale adoption by the farmers. In this context, an 8 days model training course sponsored by Department of Agriculture and Cooperation, Ministry of Agriculture, Govt. of India was organised at IISR., Officials of agriculture and cane department, Govt. of UP and KVKS participated In this training. Participants were imparted practical knowledge and information on soil health & fertility management. The Institute is implementing an intensive programme on making soil health cards in each sugar mill zone of Uttar Pradesh through soil testing following scientific procedures.

- मृदा में कार्बन की मात्रा कुछ क्षेत्रों में निम्न स्तर (0.25%) तक पहुँच गयी है जो गन्ना उत्पादन के साथ अन्य फसलों के उत्पादकता के लिए बिल्कुल निराशाजनक स्थिति है।
- आज आवश्यकता है कि कृषकों को रासायनिक उर्वरकों के साथ कार्बनिक पदार्थ, जैविक खाद, हरी खाद, फसल अवशेषों को खेतों में प्रयोग करने के लिए प्रोत्साहित किया जाए।
- राज्यों के कृषि विकास विभागों में कार्यरत अधिकारियों को सबसे पहले इन तकनीकों पर प्रशिक्षित कर उन्हें कृषकों के बीच तकनीकों को लोकप्रिय करने के लिए प्रेरित किया जाए।
- समेकित पोषक प्रबन्धन विषय पर आयोजित आठ दिवसीय आदर्श प्रशिक्षण कार्यक्रम में उत्तर प्रदेश कृषि विभाग, गन्ना विकास विभाग तथा कृषि विज्ञान केन्द्रों के प्रशिक्षणार्थीयों ने भाग लिया।



CaneDES: Expert system for disorder diagnosis

The Institute has developed CaneDES, a web based expert system for disorder diagnosis caused by biotic and abiotic stresses in sugarcane. The CanDES was developed by applying a new classified knowledge representation technique.

संस्थान द्वारा केनडेस – विशेषज्ञ प्रणाली का विकास किया गया है। इस विशेषज्ञ प्रणाली के प्रयोग से गन्ना में जैविक तथा अजैविक कारकों द्वारा उत्पन्न विकारों को पहचान कर आव यक प्रबन्धन किया जा सकता है।

Survey of cane fields in Chhattisgarh

Survey of sugarcane fields in Kawardha area of Raipur District, Chhattisgarh was conducted and it was found that the cane crop was severely infested by *Pyrrilla perpusilla* with an average 10-20 adults and 50-100 nymphs/leaf. The upper surface of leaves beneath infested leaves were covered with black sooty mould. Egg parasite, *Tetrastichus pyrillae* was present but no *Epiricania melanoleuca* (a nymph and adult parasitoid) was seen in the area. Cocoons of *E. melanoleuca* collected from IISR, Research Farm were released in the farm of S. K. College of Agriculture and Research Station, Kawardha and in Khadoda village. One *Kisan Goshthi* was organized in Khadoda village where Dr. M. R. Singh, Principal Scientist, IISR gave a live demonstration of all the stages of life cycle of *E. melanoleuca* to the farmers so that they can identify the parasite when it gets established in the area.

रायपुर (छत्तीसगढ़) के कवर्धा क्षेत्र में पायरिला कीट के आकलन के लिए गन्ना खेतों का सर्वेक्षण किया गया। सर्वेक्षण में पायरिला नाशि कीटों का प्रकोप काफी अधिक मात्रा में पाया गया। इसके नियंत्रण के लिए पायरिला के परजीवी इपीरिकेनिया कीट का कक्षन संस्थान के भोध क्षेत्र से एकत्रित कर पायरिला ग्रस्त गन्ना खेतों में छोड़ा गया। किसान गोष्ठी में संस्थान के प्रधान वैज्ञानिक डा० महाराम सिंह ने किसानों को परजीवी इपीरिकेनिया के जीवन चक्र में सभी अवस्थाओं को दिखाया जिससे किसान खुद अपने खेतों में इस मित्र कीट को पहचान पायें तथा पायरिला नाशि कीट के नियंत्रण के लिए प्रयोग कर सकें।

Sugarcane Mechanization Day

Sugarcane Mechanization Day was observed at Harinagar Sugar Mill, West Champaran, Bihar on September 26, 2014. The Institute displayed many equipments developed for cane cultivation. Three manufacturers having MOA with IISR viz., M/s Motor & General Sales Ltd., Lucknow, M/s Shubham Agricultural Implements (P) Ltd and M/s Punjab Engineers, Meerut have also exhibited commercial power weeder, power tillers, self propelled reaper binder and laser land levellers. Officials from cane department, Govt. of Bihar, Harinagar and Hasanpur Sugar Mills, and more than 2000 farmers of Bihar participated in the event.

हरिनगर चीनी मिल में आयोजित गन्ना यंत्रीकरण दिवस पर संस्थान द्वारा विकसित गन्ना खेती यंत्रों का प्रद र्न किया गया। बिहार गन्ना विभाग के अधिकारियों सहित हरिनगर व हसनपुर चीनी मिल क्षेत्रों के लगभग 2000 किसानों ने इस आयोजन में भाग लिया।

INTERNATIONAL COLLABORATION

Visit of Vietnamese Delegation to IISR

A high level delegation from Vietnam led by Mr. Le Van Tam, Chairman of Lam Son Sugar Company, Vietnam visited IISR from December 28-30, 2014 to study sugarcane and sugar beet technologies developed by IISR and to explore areas of collaborative research. The delegation led by Mr. Tam comprised of Mr. Do Nang Vinh, Mrs. Ha Thi Thuy, Mr. Tran Xuan Trung and Mr. Nguyen Duy Khai.

Dr. S. Solomon, Director, IISR highlighted the technological achievements of the Institute, challenges ahead before sugarcane and sugar sector globally and IISR future plan to address those challenges. The techniques developed by IISR viz., cane varieties, STP, ring-pit method of planting, cane-node technique, sugarcane based intercropping, bio-control of insect-pests, MHAT in 3 tier

seed programme may be very helpful in increasing cane yield in Vietnam. The delegation took keen interest in CaneDES –a computer based expert system for disorder diagnosis in sugarcane, bio control techniques like use of Tricho card for management of borer pests, light-pheromone combo trap for control of white grub and *Trichoderma* application for diseases management. The delegation visited the Agricultural Engineering Division where the operation of machinery was demonstrated.

As part of study tour the delegation visited Biswan Sugar Mill in Sitapur District of Uttar Pradesh. Dr. A. K. Sah, Principal Scientist, IISR guided the visit and explained sugarcane technologies being demonstrated in farmers' fields located in mill zone areas and outreach programme being implemented by the Institute.



Proud Moments for IISR Scientists in International Forum

A delegation of IISR scientists led by Dr. S. Solomon, Director, IISR comprising Drs. A. Chandra, T.K. Srivastava, S.N. Singh, S.K. Shukla, A.K. Sah and M. Swapna participated in the International Conference on “Green Technologies for Sustainable Growth of Sugar & Integrated Industries in Developing Countries” held at Nanning, PR China from November 25-28, 2014. Dr. A.K. Sah, Principal Scientist was honoured for best poster presentation award for the paper “Out Grower Model of Cane Development transforming farmers' and sugar mill economy: An Indian Experience”. The papers entitled “Development of diagnostic expert system in sugarcane using object oriented knowledge representation technique” (S.S. Hasan, S. Solomon. A. Baitha, M.R. Singh, A.K. Sah, S. K. Shukla and R. Kumar) and "Mechanization of Sugarcane in Developing Countries: IISR Efforts" (A.K. Singh and S. Solomon) also received best poster awards. Dr. S. Solomon, Director of the Institute was honoured with Life Time Achievement award by IAPSIT (International Association of Professionals in Sugar and Integrated Technology) for his unparalleled scientific contribution in post harvest technology of sugarcane and sugar processing, during valedictory function of International Conference. More than 150 sugarcane scientists and researchers from China, India, Australia, Brazil, Bangladesh, Colombia, Egypt, France, Fiji, Indonesia, Iran, Mauritius, Pakistan, South Africa, Sri Lanka, Thailand, USA and Vietnam participated in the Conference for mutual exchange of information in advance technology of sugarcane cultivation and sugar making. IISR Scientists interacted with the sugar industry personnel during visit to cane fields and sugar mill in Nanning.



INSTITUTE HIGHLIGHTS

National Meet on Modernization of Jaggery Industry and Jaggery Carnival Organised

A two-day National Meet on Modernization of Jaggery Industry and Jaggery Carnival was organised at ICAR-IISR from November 01-02, 2014. Mr. K. K. Gupta, Chief General Manager, NABARD, Lucknow was the chief guest in the inaugural function of the Meet and Carnival held on November 01, 2014 in the Institute's auditorium. While welcoming the Chief Guest and delegates Dr. S. Solomon, Director, IISR remarked that there is a need to intensify research efforts for technological advancement in quality jaggery and value added jaggery production in the country. The meet provided a common platform to more than 150 researchers, processors, entrepreneurs, growers for sharing of knowledge and information in different aspects in sugarcane & jaggery. While chairing the inaugural session, Dr. N. Gopalakrishnan, ADG (CC), ICAR, New Delhi said that sugarcane researchers must develop cutting edge technology by applying biotechnological and molecular marker tools for managing sugarcane diseases and pest in more effective manner. Climate resilient variety and corresponding cultivation package is the need of the hour. Dr. Bakshi Ram, Director, SBI, Coimbatore presented status on varietal scenario.

Besides being an important natural sweetener, jaggery is a rich source of energy and nutrition, thereby making it an important component of nutritional security package. Despite its tremendous scope, jaggery has remained in the background, with several challenges like low recovery, reduced shelf life, lack of modern facilities etc. The Organising Secretary of the National meet Dr. S. I. Anwar remarked that jaggery industry needs to be revived and modernized so that it becomes competitive at global level.

A Jaggery Carnival was organised with the objective to create awareness among kids, students, ladies, house wives about the health benefits of jaggery by showcasing the jaggery and related value added products. In the Carnival competitions like sack race, rabbit race, run with jaggery cubes, drawing, carving on jaggery, fancy dress competition, balloon blowing, treasure hunt, relay race, extempore, poem on jaggery, quiz, energy drinks, innovative food recipe, cane chewing and tug of war etc. were organised. A large no. of children, students and ladies participated in the competitions with great enthusiasm.

- गुड़ उद्योग के आधुनिकरण पर दो दिवसीय राष्ट्रीय संगोष्ठी तथा गुड़ कार्निवाल का उद्घाटन नाबार्ड, लखनऊ के मुख्य महाप्रबंधक श्री के. के. गुप्ता के द्वारा दिनांक नवंबर 01, 2014 को भारतीय गन्ना अनुसंधान संस्थान के प्रेक्षागृह में किया गया।
- राष्ट्रीय संगोष्ठी में 150 शोधकर्ताओं, उद्यमियों, गुड़ निर्माताओं तथा किसानों ने अपने विचार रखे।
- गुड़ के प्रति जन-चेतना जागृत करने हेतु संस्थान परिसर में गुड़ कार्निवाल का आयोजन भी किया गया। इस महोत्सव में भारत के विभिन्न प्रांतों में निर्मित गुड़ एवं गुड़ आधारित उत्पादों की एक प्रदर्शनी भी आयोजित की गई। इस अवसर पर गुड़ को प्रोत्साहन देने के लिए बच्चों, विद्यार्थियों, छात्राओं तथा महिलाओं के लिए विभिन्न प्रतियोगिताओं का आयोजन भी हुआ।



Institute Research Council (IRC) meeting held

The Institute Research Council (IRC) meeting of ICAR-IISR was held under the Chairmanship of Dr. S. Solomon, Director, IISR, Lucknow from 23-25 July, 2014. He emphasized that, IISR being a national Institute, the productivity enhancement for sugarcane is the responsibility of this Institute. The Chairman informed the house about the various initiatives taken by the Institute in this direction viz., entrepreneurship development for quality seed production, development of soil maps and soil health cards, developing linkages with sugar industry for effective technology transfer and imparting training to master trainers in sugarcane.

The research outputs viz., cane node technology for saving of seed cane and higher sugarcane yield and residue recycling along with *Trichoderma* in sugarcane production system & carbon sequestration for enhanced soil health were identified for its further development as technology. CaneDES- a web based expert system for disorder diagnosis in sugarcane was identified as technology for large scale dissemination/commercialization. The research work and activities of IISR Regional Centre, Motipur, & Sugarbeet Breeding Outpost, Mukteshwar and Pravaranagar Biological Control Centre were reviewed.

The Chairman reviewed all the ongoing research projects/activities. A special session of IRC under the Chairmanship of the Director was organized at IISR Regional Centre, Motipur on September 25, 2014 to discuss new research project proposals.

ARS-NET 2014 Examination Conducted

The Institute successfully organized Online Examination of ARS-NET 2014 at its Online Examination Centre during September 22-28, 2014. A total of 1703 candidates were allotted to IISR centre for the examination in three

schedules per day. Various examinations in online mode are conducted from time-to-time at this centre under the supervision of AKMU.



Meetings/events organized

IISR-Industry Interface on “Enhancing Sugar Productivity in Uttarakhand” at IISR Sugarbeet Breeding Outpost in IVRI Campus, Mukteshwar	July 3-4, 2014
Institute Research Council (IRC) Meeting	July 23-25, 2014
हिन्दी पखवाड़ा	सितम्बर 15-30, 2014
हिन्दी कार्यशाला-2	सितम्बर 29, 2014
World Food Day	October 16, 2014
30th Biennial Workshop of AICRP on Sugarcane, National Meet on Jaggery and Jaggery Carnival	November 01-02, 2014
नगर राजभाषा कार्यान्वयन समिति (कार्यशाला-3)	दिसम्बर 03, 2014
Institutional Biosafety Committee Meeting	December 15, 2014

TRANSFER OF TECHNOLOGY

Technology Demonstrated

Demonstrations on Ratoon Promoter were conducted at farmers' fields in command area of Biswan Sugar Mill, Biswan, Sitapur (U.P.). For fast spread of newly released cane varieties, cane seed production technology was demonstrated on farmers' fields in Biswan area and seed crop of varieties CoLk 94184, CoPK 05191, Co 05011, CoH 128, Co 0118 and Co 0238 was raised on 10 ha area. Mass production and release of *Trichogramma sp.* was carried out against sugarcane borers in farmers' fields at Pravaranagar, Distt. Ahmednagar, Maharashtra.

बिसवाँ चीनी मिल, सीतापुर के किसानों के खेतों पर पेड़ी प्रबन्धन यंत्र का प्रदर्शन किया गया। गन्ने की संस्तुत नवीन किस्मों का स्वरूप बीज गन्ना उत्पादन के लिए कोलख 94184, को.पीके. 05191, को. 05011, को. 0118, को. 0238 तथा को.ह. 128 किस्मों पर किसानों के खेतों तथा चीनी मिल प्रक्षेत्र पर प्रणाली एवं परिणाम प्रदर्शन किया गया। प्रवानगर, महाराष्ट्र में किसानों के खेतों में बेधक कीटों के प्रबंधन के लिए ट्राइकोग्रामा का उत्पादन कर गन्ना खेतों में रिलीज किया गया।



Entrepreneurship Training conducted

To develop entrepreneurial ability of cane growers in cane seed production, multiplication and marketing, entrepreneurship trainings were organised in the months of July, October and December 2014 at Manpur farm of Biswan sugar mill in Sitapur district of Uttar Pradesh.

बीज गन्ना उत्पादन, सम्बर्धन, विपणन में किसानों की उद्यमिता क्षमता विकास के लिए बिसवाँ चीनी मिल क्षेत्र के किसानों के लिए जुलाई, अक्टूबर तथा दिसम्बर 2014 में उद्यमिता विकास प्रक्षण आयोजित किया गया।



Showcasing of Sugarcane Technology

Sugarcane production technologies were showcased in the Agr-Exhibition organised during 10th Indian Fisheries and Aquaculture Forum and 5th Global Symposium on Gender in Aquaculture held at NBFGR, Lucknow from November 12-15, 2014. The Exhibition was inaugurated by Hon'ble Governor of U.P. Shri Ram Naik Ji on November 12, 2014. DG, DDGs from ICAR, Directors of ICAR Institutes, scientists from National and International Research Institutes, representatives of agri-input agencies, entrepreneurs, farmers and students visited IISR stall and appreciated the showcased cane technologies.

राष्ट्रीय मत्स्य आनुवंशिक संसाधन व्यूरो, लखनऊ द्वारा दिनांक नवम्बर 12-15, 2014 को आयोजित दसवीं भारतीय मत्स्य एवं जल संस्कृति फोरम में संस्थान द्वारा गन्ना उत्पादन तकनीकों पर प्रदर्शन स्टाल लगाया गया। संस्थान द्वारा प्रदर्शित तकनीकों को विशिष्ट अतिथियों, वैज्ञानिकों उद्यमियों, विद्यार्थियों तथा किसानों ने देखा तथा सराहा।



Bihar cane growers benefitted from sugarcane information

On Invitation of Sugarcane Industry Department, Patna, Govt. of Bihar, IISR deputed Dr. A. K. Sah, Principal Scientist to address cane development staff and cane growers of Bihar and he delivered lecture on scientific cane cultivation in a *Kisan Gosthi* organised on November 19, 2014 in the world famous Harihar Kshetra Sonpur Mela-2014 held in Sonpur, Saran (Bihar) from November 05-04 December, 2014. More than 1000 farmers, cane development staff of Bihar turned out in the *Gosthi* and interacted with Dr. Sah for useful information in scientific cane cultivation.

विश्व प्रसिद्ध हरिहर क्षेत्र सोनपुर मेला में आयोजित किसान गोष्ठी में गन्ना तकनीकों पर संस्थान के प्रधान वैज्ञानिक डा० ए०क० साह ने नवम्बर 19, 2014 को व्याख्यान दिया। गोष्ठी में बिहार के विभिन्न जिलों से 1000 से अधिक किसानों तथा गन्ना विकास कार्यकर्ताओं ने डा० साह द्वारा दिये गये जानकारी का लाभ उठाया।

Trainings Organised

Name of Training	Topic	Duration	Sponsoring agency	Participants
21 days National training	Sugarcane Management and Development	1-21 July, 2014	Sugar mills	16 cane development officers
7 days hand on training	Soil Analysis	July 22-28, 2014	DSCL sugar group, UP	15 cane development staff
8 days students training	Advances in Sugarcane Production Technology	June 20 to 27, 2014	Institute of Agricultural Sciences, BHU, Varanasi	12 B.Sc. (Ag.) Students
8 days MTC	Integrated Nutrient Management for Improving Soil Health and Enhancing Nutrient Use Efficiency	October 13-20, 2014	DAC, Ministry of Agriculture, Govt. of India	20 development officers
3 days entrepreneurs training	Sugarcane Production Technology and Jaggery Making	October 15-17, 2014	Touchstone Services Pvt. Ltd., Jabalpur	03 farmer entrepreneurs
3 days training	Sugarcane Production Technology	November 05-07, 2014	Mahakaushal sugar and power industries Ltd. Bachai, Dist-Narsinghpur, M.P.	07 cane development staff
3 days training	<i>Ganna utpadan taknik</i>	December 23-25, 2014	Project Director, ATMA, Seoni, M.P.	14 farmers



Outreach Programme

The Institute participated in the Exhibition and the scientists delivered talks in the *Kisan Goshthi* organized on December 13-14, 2014 in villages Rasulpur Jatan and Barwala of Distt. Muzaffarnagar, U.P.

A three days training-cum-demonstration programme on the various aspects of sugarcane and jaggery production technologies was organized during December 12-14, 2014 in three villages of Sugar Factory Command area of Kabirdham district of Chattisgarh.

A three days training programme on “Technological interventions for enhancing cane and sugar productivity in Western Maharashtra” was organized at the IISR Biological Control Centre at Padmashri Dr. V.V.Patil, S.S.K. Pravarangar from September 14-16, 2014. More than 150 progressive cane growers of the area and 350 cane development staff of both the units of P.D.V.V.S.S.K. Ltd.,

Pravarangar and Ganeshnagar participated in the training. Dr. S. N. Singh, I/c, Pravarangar Biological Control Centre was the Coordinator of the training programme.

उत्तर प्रदेश के मुजफ्फरनगर जिले के रसुलपुर जटान तथा बरवाला गाँवों में किसान गोष्ठी का आयोजन दिसम्बर 13-14, 2014 को किया गया जिसमें संरथान के वैज्ञानिकों ने गन्ना उत्पादन तकनीकों पर क्षेत्र के गन्ना किसानों को विस्तार पूर्वक जानकारी दिया। दिसम्बर 12-14, 2014 को छत्तीसगढ़ राज्य के कबीरधाम जनपद में स्थित चीनी मिल क्षेत्र में तीन दिन प्रौद्योगिकी कार्यक्रम आयोजित किया गया जिसमें उन्नत गन्ना और गुड़ उत्पादन तकनीकों पर जानकारी दी गई। संरथान के जैविक नियंत्रण केन्द्र, प्रवरानगर में पश्चिमी महाराष्ट्र क्षेत्र में गन्ना तथा चीनी उत्पादन बढ़ाने के लिए आवश्यक तकनीक विषय पर तीन दिवसीय प्रशिक्षण कार्यक्रम का आयोजन सितम्बर 14-16, 2014 को किया गया जिसमें 150 प्रगतिशील गन्ना किसान तथा 350 गन्ना विकास कार्यकर्ताओं ने भाग लिया।

HUMAN RESOURCE DEVELOPMENT

Awards and Recognition

- Dr S. K. Shukla, and Dr. S. Solomon received the Noel Deerr Gold Medal by the Sugar Technologists Association of India in 73rd Annual convention of STAI held at Bengaluru, September 9-11, 2014. Dr. A.K. Sah & Dr. S.S. Hasan also participated in this convention.
- Dr. S.K. Shukla was awarded 2014 FAI Golden Jubilee Award for excellence in the field of Nutrient Management in Sugarcane on December 10, 2014 at New Delhi.
- Dr. Sangeeta Srivastava was conferred on SAB Award of Excellence in Plant Genomics for 2014 at Asian Biotechnology Congress held on November 1-3, 2014 at Lumbini, Nepal.
- Dr. S. Solomon was honoured with Life Time Achievement award by IAPSIT (International Association of Professionals in Sugar and Integrated Technology) during International Conference: IS 2014 held at Nanning, PR China from November 25-28, 2014.
- Drs. A.K. Sah and S. Solomon received Best poster award for the paper presented on "Out Grower Model of Cane Development in India" in the International

Conference "IS-2014 on Green Technologies for Sustainable Growth of Sugar & Integrated Industries in Developing Countries" held at Nanning, PR China from November 25-28, 2014.

- Best Poster presentation awards were given to papers presented on "Development of diagnostic expert system in sugarcane using object oriented knowledge representation technique" (S.S. Hasan, S. Solomon. A. Baitha, M.R. Singh, A.K. Sah, S. K. Shukla and R. Kumar) and "Mechanization of Sugarcane in Developing Countries: IISR Efforts" (A.K. Singh and S. Solomon) in the International Conference on "Green Technologies for Sustainable Growth of Sugar & Integrated Industries in Developing Countries" held at Nanning, PR China from November 25-28, 2014.
- Drs. R.K. Rai, S. Solomon and Pushpa Singh were conferred Best Sugarcane Agriculture Paper Award for Sugar as well as Allied Industry by "Bharatiya Sugar" in the Sugar Convention held at Yashwantrao Chavan Sabhagruj, Rajaram College, Kolhapur on October 13-14, 2014.

Training to Scientists in frontier areas of research

- A Winter School on "Novel Genomic Tools and Breeding Approaches for Sugar Crops Improvement" was held at IISR, Lucknow during September 9-29, 2014.

राजभाषा प्रकोष्ठ

- राजभाषा पत्रिका 'इक्षु' को वर्ष 2013-14 हेतु भारत सरकार के राजभाषा विभाग द्वारा 'क' क्षेत्र के लिए 'हिंदी गृह पत्रिका पुरस्कार (द्वितीय)' प्रदान किया गया।
- संस्थान से प्रकाशित पुस्तक "गन्ना आधारित फसल पद्धतियाँ : बदलता परिदृश्य एवं तकनीकी विकास" को राजीव गांधी राष्ट्रीय ज्ञान विज्ञान मौलिक पुस्तक लेखन पुरस्कार के लिए प्रोत्साहन पुरस्कार प्रदान किया गया है। यह पुरस्कार 14 सितम्बर 2014 को नई दिल्ली में माननीय राष्ट्रपति महोदय द्वारा राष्ट्रपति भवन में पुस्तक के लेखकों डॉ अनिल कुमार सिंह एवं डॉ सुशील सोलोमन को दिया गया।
- संस्थान से प्रकाशित राजभाषा पत्रिका 'इक्षु' वर्ष 3 व अंक 2 (जनवरी - जुलाई 2014) को नगर राजभाषा कार्यान्वयन समिति, लखनऊ द्वारा प्रथम पुरस्कार प्रदान किया गया।
- सुश्री नीता चौधरी, सचिव, राजभाषा विभाग, गृह मंत्रालय ने दिनांक 20. 11.2014 को संस्थान में भ्रमण कर हिंदी में किए जा रहे कार्यों का अवलोकन एवं कार्मिकों को संबोधित किया।



World Photography Day

World Photography Day was celebrated at the Institute on August 19, 2014. On this occasion, a photography competition was organized and the best photographs were awarded. An exhibition of the photographs on "Monsoon Magic on Sugarcane" was also held from August 19-21, 2014.



Distinguished Visitors

- Sh. Radha Mohan Singh, Hon'ble Minister of Agriculture, Govt. of India visited on November 8, 2014.
- Dr. Sanjeev Kumar Balyan, Hon'ble Minister of State for Agriculture and Food Processing Industries visited on September 1, 2014.

- Dr. S. Ayyappan, Secretary, DARE and DG, ICAR visited on September 5-6, 2014 to Chair the meeting of ICAR Regional Committee (Zone IV) held at IISR, Lucknow.
- Ms. Nita Chowdhury, Secretary, Deptt. of Official Language, Ministry of Home Affairs, GOI visited on November 20, 2014 and reviewed the official work done in the official language.



UPCOMING EVENT

National Training on Sugarcane Management & Development

(July 1-15, 2015)

With the objective to groom and train the cane development personnel of sugar mills in latest technology of sugarcane cultivation and development, IISR will organise a 15 days National training from July 1-15, 2015

Training fee and tariff : Rs.10,000 per participant.

Lodging and Boarding fee : Rs.450 (Non-AC) & Rs.550 (AC) per day per participant (on twin sharing basis) in addition to training fee.

Nomination: The nomination for cane development staff from sugar mill should reach to the Director, ICAR-IISR, Lucknow by June 15, 2015 along with requisite training fee (i.e. Rs. 10,000). Since the seats are limited, the officers will be selected on first-come, first-serve basis.

Contact:

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स्वच्छता अभियान

माननीय प्रधानमंत्री श्री नरेन्द्र मोदी जी के राष्ट्रीय स्वच्छ भारत मिशन को पूरे देश में जन अभियान के रूप में चलाने के आहवान पर संस्थान में स्वच्छता अभियान की शुरुआत गाँधी जयंती के मौके पर 2 अक्टूबर, 2014 को की गई। बापू के 150वीं जयंती वर्ष 2019 में स्वच्छ भारत के सपने को साकार करने के लिए गाँधी जयंती 2 अक्टूबर, 2014 पर स्वच्छता अभियान की शुरुआत पूरे देश भर में की गई है।

स्वच्छता अभियान की शुरुआत करते हुए संस्थान के निदेशक ने स्वच्छता शपथ लिया तथा संस्थान के वैज्ञानिकों, अधिकारियों तथा कर्मचारियों से यह अपील किया कि वो अपने—अपने कार्यालय, आवासीय, परिसर, सामाजिक परिसर तथा अन्य स्थानों को साफ रखने में अपना महत्वपूर्ण योगदान दें साथ ही अन्य लोगों को भी स्वच्छता के लिए जागरूक करें।



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