

IS-2011, International Sugar Conference and Expo: A Success Story

The 4th IAPSIT international sugar conference and expo on “Balancing Sugar and energy Production in Developing Countries: Sustainable Technologies and Marketing Strategies” was held at hotel Parkland Exotica, New Delhi, India from 21-25 November, 2011. The conference was jointly organized by IAPSIT, The Sugar Technologists Association of India (STAI) and Society for Sugar Research & Promotion (SSRP). Over 600 researchers, technologists, managers, manufacturers, suppliers and policy makers from 32 sugar producing countries participated to share their views and experiences for profitable and sustainable growth of the sugar and its integrated industry in the developing countries. The IS-2011 Conference was a major event for all the professionals involved in the sugar, ethanol, energy & integrated industries and provided an unrivalled overview of all new happenings in the sugar and energy sectors.

The IS-2011 Conference focused on the following aspects related to sugar crop and their integrated industries:

- New and emerging technologies to enhance sugar and energy production from sugar crops and to protect the environment, experience from BMP in developed countries, mechanization of small farms;
- Conventional and biotechnological approaches in improving and protecting (from pests and diseases) sugar crops, their diversified products, and organic sugar;
- Carbon, energy and water footprints in sugar crops production, processing and value addition, resource & energy management in sugar industry, climate change and crop productivity, CDM;
- Sugar crops based integrated industries, optimal utilization of sugar crops value chain, bio-fuels;
- Socio-economic initiatives to restructure cane development programs, logistics, marketing and infrastructural facilities in sugar industry, MIS and training needs; technology transfer and empowering small planters to adopt new technologies;
- Sugar-energy matrix in developing countries: challenges, barriers, trade opportunities, sustainability issues, prospects for sugar refining, key drivers of the world sugar economy, WTO and national policies impacting sugar business.

Inaugural ceremony of IS-2011 Conference & Expo: The conference was inaugurated by honorable Shri Sharad Pawar, Minister of Agriculture and Food processing, Government of India and Shri Farooque Abdullah, Minister of New and Renewable Energy Sources,(MNRES) Government of India on 21st November, 2011. Dr. S. Solomon, President & co-ordinator of IS-2011, Prof Yang Rui Li, President IAPSIT and Dr G.S.C. Rao, President STAI joined hands in lighting the lamps for official beginning of IS-2011. Dr. S.Solomon welcomed Chief Guest, Hon’ble Shri Sharad Pawar and the Guest of Honor Shri Farookh Abdullah, Mr. Festus Kataberia, High Commissioner of Kenya;Mr. Abelardo Cueto Sosa, Ambassador of Cuba;er Excellency Mrs. Gennet Zewide Ambassador of Ethiopia; HE Mr. Prasad Kariyawasam, ambassador of Nigeria; Mr. Hussein A Rajab, Commercial Consular of Iraq; Mr. Michael Angelo D Roaring, Commercial Attachee to Embassy of Iraq; and Mr. Rodrigo Gallardo, Agriculture and Commercial Consular to Government of Chile , Dr.Peter Baron, President of International Sugar Organization and Shri Abinash Verma, DG, ISMA. He also welcomed over 220 overseas delegates who came from China , Iran, Australia, Brazil, Dubai, Egypt, Fiji, France, Indonesia, Iraq, Mauritius, Myanmar, Nigeria, Pakistan, Reunion Island, Saudi Arabia, South Africa, Sri Lanka, Thailand, United Kingdom, USA, Vietnam, Kenya, Japan, Zimbabwe and

Bangladesh. The president of IAPSIT Prof. Li Yang Rui welcomed chief guests and all international and national delegates. In his inaugural address, he appreciated the efforts and support received from the Sugar Technologists Association of India, Indian Sugar Mills Association (ISMA) and especially Government of India. Dr. Li said that “ We are privileged to be in this beautiful country which is famous in the world for it’s “Unity in Diversity culture”. India is also known as the ‘Original Home of Sugar and Sugarcane’ and is world 2nd largest producer and highest consumer of sugar. The Indian Sugar industry is famous for its great potential, being capable of providing enough sweeteners to over 1.30 billion people. In addition it has developed and mastered the technologies to produce bio-electricity, bio-ethanol, bio-manure and many co-products without any adverse impact on environment. As a matter of fact, Indian sugar industry is highly eco-friendly and developing countries are looking at India for such a perfect model. It is important to note that nearly 7.5% rural Indian population depends upon sugarcane for their livelihood and therefore its significance in socio-economic life of masses can not be ignored. Today we have gathered here to discuss about this Crop, which is grown in over 100 countries in approximately 24 Million hectare land. This crop provides us food, feed, fuel, shelter, paper, boards, medicines and if I don’t exaggerate , probably in next 10 to 15 years all our vehicles will run on ethanol produced from sugarcane. This is indeed one of the most “useful plant on the planet Earth” and new researchers have shown that cultivation of sugarcane has a cooling or air conditioning effect on the climate. With so many economic and social bounties this crop is facing enormous threats from biotic and abiotic stress, natural calamities, declining productivity and many others. The cost of cultivation has seen a meteoric rise in last 10 years. In this context, the yield and sugar recovery are static since last 10-15 years. However, the plant per se has enormous potential which is still untapped, be its productivity, energy or by-products. If this remain stagnant for next few years all our future planning of modernization, expansion of sugar industry, bioethanol blending program will go haywire if sugarcane productivity & production in developing countries are not improved substantially. I am of the opinion that average world sugarcane productivity should be around 100 ton/ha from its present level of 70 tons/ha to able to sustain our sugar and energy industry without any further escalation in its cost of cultivation. This is possible only through progressive introduction of scientific cultivation of sugarcane crop. As You know that sugarcane cultivation is facing many old and emerging challenges which are a hindrance in improving sugarcane productivity in developing countries, it is imperative that new and innovative methods should be tried in its production, protection and processing. The IAPSIT took up this responsibility to organize scientific & technical meetings and conferences of world renowned experts to discuss the problems and suggest viable solutions which are impeding sugarcane production and productivity” . Dr. G.S.C. Rao, President STAI lauded the efforts of STAI and achievements of Indian sugar industry in recent past which has emerged as global leader in sugar and energy production from sugarcane.

The Proceedings of international conference IS 2011 “Balancing Sugar and energy Production in Developing Countries: Sustainable Technologies and Marketing Strategies” (Eds.: Y.R. Li, M.K. Srivastava, G.P. Rao, P. Singh, S. Solomon) was released by Honorable Ministers Shri Sharad Pawar

and Shri Farooque Abdullah. They have also released a special Souvenir of conference and related literature. On this occasion a special issue of Sugar Tech, an international sugarcane journal and a reference book on sugarcane physiology and biochemistry entitled "Ethephon: Impact on Sugarcane Physiology and Sugar Productivity" by R. Jain, S. Solomon, Amaresh Chandra and A.K. Shrivastava was also released by the Honorable Ministers.

The inaugural ceremony was followed by the plenary lectures from Dr Peter Baron, President, International Sugar Organization, USA, Mr. Abinash Verma, Director General, Indian Sugar Mills Association, India, Dr. Rene K.F.G. Kee Kwong, Director, Mauritius Sugar Industry Research Institute, Dr. TSG Lee, UFSCAR, Brazil, Dr. Yong Bao Pan, USDA-ARS, USA, Dr. Raffaella Rossetto, APTA Brazil and Dr. Kathy Hurley, Canegrowers, SA. Many national and international sponsors of the conference presented their speeches. The day was ended with a spectacular show of Indian Cultural Dances, collectively known as "Satrangi" (seven colors) which was enjoyed and appreciated by all foreign delegates.

With the elemental theme "Balancing Sugar and energy Production in Developing Countries: Sustainable Technologies and Marketing Strategies", all the sessions started on 22nd November and continued till 23rd November, 2011 followed by a valedictory session. In total, 218 original research papers were accepted for presentation, of which 115 papers were presented orally while 103 papers were presented as short presentations and poster.

Session I: Sugar crops-Agriculture and mechanization

The session was held at Angel Wing hall and chaired by Dr Yang Rui Li, China and Dr. R.N.G.K. Kwong, Mauritius. Dr Jack Comstock, USA accompanied them as Special Invitee and also delivered a special lecture on sugarcane breeding. The session was coordinated by Dr. Raffaella Rossetto, Brazil with the help of Rapporteur Dr. T. Mardamootoo, Mauritius. Total 48 research papers covering aspects of agronomy, physiology, biochemistry, soils and microbiology, pests and disease and mechanization were presented by sugarcane professionals from 16 countries. This session covered the recent developments in the fields of sugarcane fertilization and nutrient management, varietal selection to enhance yield, physiological mechanisms to optimize production, water use efficiency, abiotic (waterlogging, drought, low and high temperature) stresses, factors affecting yield and yield decline, weed control, environmental protection, cultural practices (paired rows, planting technology), trace elements, organic matter transformation, physical properties and mechanization (planting and harvesting).

Session II: Sugar crops-Breeding and biotechnology

Second session was held at Alpine Aster hall and chaired by Dr. Yong Bao Pan, USA and Dr. S.V. Nair, India. Dr. M.I. Nasr, Egypt accompanied them as special invitee. This session was coordinated by Dr. Isabelle Guinet-Brial, France with the help of Rapporteur Dr. Amresh Chandra, India. Dr. S.V. Nair, Director, Sugarcane Breeding Institute, Coimbatore, India has delivered a special lecture on Biotechnological approaches in sugarcane breeding. Total 35 research papers unfolding the information on germplasm resources, commercial breeding, introgression breeding, pollen biology, energy canes, genetics, molecular biology, tissue culture and transformations were presented by sugarcane professionals from 10 countries in this session. The major research findings unfolded by these papers gave a deep insight for understanding marker assisted introgression breeding, genetic diversity amongst sugarcane germplasm, gene cloning and expression, trait associated DNA markers, variety fingerprinting and innovations in tissue culture techniques for sugarcane. The chairmen of session in their concluding remarks recommended molecular biologists to work closely with conventional cane breeders on a routine basis and help them in improving the efficiency of germplasm utilization, crossing and hybridization and selection procedures. In his concluding remarks, Dr Yang Bao Pan expressed that due to extreme genotype x environment interactions, commercial clones may perform very differently in different environments. Therefore, testing at multiple sites may be essential to select useful varieties. He added that *"A trash in one breeder's hands may turn into gold for others"*. Honourable chairmen recommended to sugarcane breeders across the globe for freely exchanging their germplasm, whether elite or exotic, whether in the form of vegetative cuttings (setts) or seeds (fuzz), in order to maximize the genetic base of modern sugarcane breeding.

Session III: Sugar crops: Processing and value addition

The third session was held at Cosmos Hall and chaired by Mr. A. K. Srivastava, India and Dr. R.V. Dani, India. Mr. Le Van E Dinh, Vietnam accompanied them as special invitee. This session was coordinated by Dr. (Ms.) S.K. Uppal, India with the help of Rapporteur Dr. (Ms.) Satinder Kaur, India. Mr. Ajay Mathur, India has delivered a special lecture on processing technology and value addition. Total 34 papers covering recent researches on alcohol production technology, sugar processing and clarification, power cogeneration and energy conservation were presented in this session. Major research achievements which could open new opportunities to process sugarcane products and intensify the scope and utility of sugar crops included use of different kind of yeast for producing dine alcoholic drinks with different aromas and flavor. Use of alternative sources such as sweet sorghum for production of alcohol and power cogeneration was also highlighted. Research progresses in developing techniques for saccharification of bagasse and sawdust for production of cellulosic ethanol were also discussed in this session.

In order to make sugar factories highly efficient, a sugar muddy juice clarification and dewatering technology was presented which could help in energy conservation and in creating

more green and clean fuel for cogeneration, vis-s-vis, reduce sugar losses, save space and power consumption. Sugar clarification using biodegradable wastes such as saw dust and orange peels was also sounding great as a step towards *Green Technology*. Bio-deterioration of stored cane juice is the major problem in sugar industries and results in enormous loss of sugar. Use of stabilized halogen compound as bactericide was suggested in sugar processing units. Scopes of enhanced carbonation and phosphotation clarifiers for improving production efficiency and product quality of sugar refineries was also discussed. In cogeneration, reduction of total steam consumption below 38% on cane is imperative to increase the viability of cogeneration projects. Various alternatives such as increase in feed brix, reduction in movement water, reducing recirculation index increasing exhaustibility, automation of crystallization process along with skilled staff and use of modern design pans for reducing pan vapor demand were discussed. The roll model of cottage sugar plant in Nigeria was presented which has been proved to give higher benefits in small scale industries.

Session IV: Sugar crops: Management, marketing and sustainability issues

The session was held at Cosmos hall and chaired by Mr. Jai Gawander, Fiji and Dr. (Ms.) Kathy Hurley, South Africa. Dr. Siegmund Bertrand, Reunion accompanied them as Special Invitee. The session was coordinated by Dr. Li Tao Yang, China with the help of Rapporteur Dr. A.K. Shrivastava, India. This session covered thirteen papers on management, marketing and sustainability issues of sugarcane crop and industry. The success stories, achievements, merits and barriers in development of world's best sugar industries have been discussed. The difficulties in travelling ways from 100 TCD mills to 30000 TCD modernized sugar complexes were shared. Papers on quality improvement in the strategic and competitive mode for successful marketing of high quality sugar products were presented. Dr JS Gawander from Fiji presented a scenario of climatic conditions at 4 sugar mills in Fiji and emphasized climatic parameters like rainfall and temperature are important in influencing not only cane yield but also the sugar yields. Concerning issues of low cane productivity in India and South East Asia which are causing industrial dilemmas were discussed. Initiatives undertaken by SA Canegrowers through clustering, collaboration and goal alignment, etc., were looked upon. Diversification to increase the income of sugarcane farmers was suggested. Emerging technologies for jaggery production, its grading and marketing and role of co-operatives for the benefit of jaggery producers was also discussed during the event.

In their concluding remarks, honorable chairmen pointed out on need for cane development at the millers initiative in the sustainability issues and spirit. They suggested that efforts should be intensified for the well being of the small and marginal farmers in sugarcane growing countries. Strategies to defend against in the eventualities of climate change should be worked out and cottage/ artisan sugar industry needs to be developed and improved. Based on the Brazilian experience, sugarcane growing countries should ensure sugar mill managed planting and maturity wise harvesting and emphasis on ratoon management for improving cane/ sugar production.

Poster session

The poster session was organized on 22nd November, 2011 in Alpine Aster hall. It was co-chaired by Dr. T.S.G. Lee, Brazil and Dr. He Hong, China. This session was coordinated by Dr. Priyanka Singh, India and Dr. Rochana Tangkoonboribun, Thailand with the help of rapporteur Dr. R. Vishwanathan, India. Total 88 posters covering wide areas of research and developments in sugar crops (sugarcane, sugar beet and sweet sorghum) and integrated industries were displayed. Out of all the posters displayed, 36% were related to the recent developments in agronomic practices including use of factory wastes, waste waters, organic and inorganic components as bio-fertilizers; sub-soil drip irrigation with fertilizers, pesticides, plant growth regulators and Mycorrhizas; tillage methods and fertilizer applications; new high yielding biotic and abiotic stress tolerant varieties; interactive effects of salinity and fertilizers; influence of dry matter residues on sugarcane fields; harvest dates; ratoon potential; weed management and pre-harvest burning, etc.

Sixteen percent posters covered multi aspects of breeding including biotic and abiotic resistance breeding; mutation breeding; genotype x environment interaction analysis; molecular approaches and marker assisted selection, etc. Other disciplines included physio-biochemical mechanisms of post harvest losses; ratoon decline; effect of plant growth regulators and ethephon on ripening, etc. Amongst the posters on soil, microbiology, disease and pests and their management, CIRAD's sugarcane quarantine unit, proposed a comprehensive service guaranteeing the disease-free status of the planting material, and the respect of plant breeders' intellectual property rights. At the end of session, some posters have been awarded prizes for best research work.

Business Interaction Meeting

A special interactive business meeting was also organized in the conference which was chaired by Dr G. S. C Rao and coordinated by Dr. S. Solomon, Mr. Anil Shukla and Dr. P. Singh. The sugarcane breeders, researchers and industrialists from more than 20 countries attended the meeting for finding possibilities of collaborative projects, exchange of technologies and sugarcane varieties, academic exchanges and joint research and training programs.

Valedictory Session

Valedictory session was chaired by Dr. Yang Rui-Li, China and Dr. G.S.C. Rao, India with special invitee Mr. Kitti Choonhawong, Thailand. This session was coordinated by Dr. S. Solomon, India and Mr. Jai S. Gawander, Fiji. The awards were given to various sugarcane professionals for their

excellent contribution in IS-2011. The Conference was officially closed after vote of thanks given by president of IAPSIT, Prof. Yang Rui Li.

Awards by Society of Sugarcane Research and Promotion (SSRP)

On the occasion of IS-2011, jointly organized by Society of Sugarcane Research and Promotion (SSRP) and Association of Sugarcane Technologists of India (ASTI), a graceful award giving ceremony was organized by SSRP. Dr G.P. Rao, President SSRP and Editor-in-Chief, Sugar Tech awarded Fellow of SSRP for the year 2011 to Prof. Yang Rui Li, China and the Scientist of Year Award to Prof. Hong He, China.

Visit to Simbhaoli Sugar Complex and sugarcane fields

On 24th November, 2011, all the delegates visited Simbhaoli Sugar Complex, one of the most modernized and high tech sugar Complexes. Since 1933, Simbhaoli has played a key role in making life a little sweeter on a daily basis. Simbhaoli Sugars is a technology company with a business mix that spans specialty sugars, quality liquor, technology consultancy, co-generated power, extra neutral alcohol (ENA), ethanol and bio-manure. As India's largest integrated sugar refinery, the Company has pioneered path-breaking innovations in sugar refining (Defeco Remelt Phosphotation and Ion Exchange technology), high value, niche products (specialty sugars) and clean energy (ethanol). The event was organized by Dr G.S.C. Rao, CEO, Simbhaoli Sugars, India. Followed by visiting sugar mill and distillery, delegates visited sugarcane fields and advanced high yielding Indian varieties.

Visit to Taj Mahal

At the brink of dawn when the first rays of the sun hits the dome of this epic monument, it radiates like a heavenly abode, cloaked in bright golden. And then at dusk, basking in the glory of moon, it shines like a perfectly carved diamond; appearing as if straight out of some magical tale, leaving the viewers awestruck by its sense of grandeur. Nothing short of an architectural marvel, no wonder it stands proud at being one of the Seven Wonders of the World. We have organized a grand

trip to Agra, City of Tajmahal, the delegates were astonished yet delighted to see the beauty of Tajmahal. Everyone enjoyed the trip which was ended with shopping of souvenirs.

Conclusions

Sugarcane is a wonder crop having great biomass, water use efficiency and ratio of energy returned to energy invested. Though it has a stable production of 60-85t/ha in many countries, its total potential has not been yet exploited either traditional crossing or through the biotechnological approaches, nevertheless, there is no doubt that it is the energy to drive tomorrow. For the first time there is a huge interest of the multinational companies in sugarcane, fuelled by the realisation that sugarcane will be a critical component of future biomass production. The quality and quantity of the researches on sugarcane has raised the bar considerably. There is need to build partnerships to ensure that we get access to high throughput technology platforms for sustaining sugarcane and integrated industries.

In the words of renowned horticulturists and botanist Prof. *Liberty Hyde Bailey* "Humble is the grass in the field, yet it has noble relations. All the bread grains are grass - wheat and rye, barley, sorghum and rice; maize, the great staple of America; millet, oats and sweetness of the world sugar cane. Other things have their season but the grass is of all seasons... the common background on which the affairs of nature and man are conditioned and displayed".

The successful conference was officially closed with warm hearted bon voyage to all delegates and a firm belief to meet again in China for IS-2014.

S. Solomon
President
IS-2011