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PRESIDENT ISEB'S NEW YEAR MESSAGE

Almost a decade before joining CSIR-NBRI as its Director, I had joined NBRI-based International Society of Environmental Botanists (ISEB) as its life member. Later, I was also elected as its Executive Councilor. I feel honored that on assuming the charge of Director NBRI, I was simultaneously elected as President of this prestigious Scientific Society, which has won many laurels at national and international levels during its 22 years existence.



ISEB was founded at a meeting of environmental scientists held at NBRI on 3rd December 1994 to promote and highlight the role of plants in the cause of environmental protection, biodiversity conservation, bio-remediation and sustainable plant wealth utilization. From just a 28 member society it is now a 450 members' strong scientific body which has spread its wings far and wide, not only in all corners of India but in many foreign countries also. In recognition of its outstanding contribution to environment and plant science, International Union of Biological Sciences (IUBS), Paris awarded its scientific membership to ISEB, which is a rare honour for any Indian scientific society.

To promote its objectives, ISEB, in collaboration with CSIR-NBRI, organized five highly successful International Conferences on Plants and Environmental Pollution (ICPEP) at NBRI during 1996, 2002, 2005, 2010 and 2015, which were attended by a large number of delegates from over 50 countries of the world. ISEB is publishing a quarterly newsletter *EnviroNews* since January, 1995 and the current issue (January, 2017) is the 89th issue of this highly popular news magazine which has a worldwide circulation through its print and electronic editions. ISEB maintains a highly informative and educative website (<http://isebindia.com>) which has been accessed by over 70,000 individuals from more than 150 countries.

During all these years, apart from its academic activities of highest standard, ISEB also organized a large number of outreach programmes like popular and scientific lectures, training programmes, art and painting competitions etc. for school children, both in rural and urban areas.

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HAPPY NEW YEAR 2017

President and Members of the Executive of
International Society of Environmental Botanists
Wish a Very Happy, Fruitful and Prosperous New Year to all
Members of ISEB and readers of *EnviroNews*
With this issue, *EnviroNews* enters the 23rd year of its publication

The latest feather in ISEB's cap is the launching of a world class biannual International Scientific Journal "**International Journal of Plant and Environment**" from the year 2015. Two issues of the journal have already been released and they have won instant acclaim by the scientific world.

The distinguished Indian scientist and former Director General of CSIR, Dr. R.A Mashelkar in a message stated: "International Society of Environmental Botanists is a useful off-shoot of CSIR's National Botanical Research Institute, Lucknow. I am particularly happy to see it carrying out an important task of bridging international linkages in the field of environmental botany."

While deeply appreciating the contributions of ISEB in highlighting and promoting the role of plants in environmental protection and biodiversity conservation, I also acknowledge its role in informing and sensitizing the scientists in different parts of the world about the research carried out by the scientists at CSIR-NBRI through ISEB's newsletter, website, journal and international Conferences. I appreciate this symbiotic relationship between CSIR-NBRI and ISEB. On behalf of CSIR-NBRI, ISEB and on my own behalf, I extend my warmest greetings and best wishes to all members of ISEB and readers of *EnviroNews* for the New Year 2017.

Prof. Saroj K. Barik
President ISEB & Director
CSIR-NBRI, Lucknow, India

LETTERS

No one across the planet can now ignore the beneficial health promoting roles of mushrooms. There is no doubt that mushrooms are now considered as an important aspect of global nutraceutical and functional food industries; however, caution about mushroom poisoning must be addressed at the same time. It is safe to consume mushrooms produced by certified and/or registered commercial producers only. It is extremely dangerous to collect unidentified mushrooms from forests for consumption in developing and under developed nations. Several such species are often loaded with highly toxic chemicals as a defensive measure against predators; and are potentially dangerous for both human and animal consumption. Unidentified colored mushrooms must be avoided at any cost as they could be poisonous toadstools responsible for most deaths due to mushroom poisoning. Repeated media news across the Indian subcontinent where rural residents and fringe forest communities as well as indigenous forest residents dying from mushroom poisoning due to consumption of unidentified or misidentified wild mushrooms is extremely sad and should be addressed seriously. Often entire family have been reported dead due to such incidents. It is a worrisome trend and need to be seriously investigated. Mushrooms are beneficial to health but care must be taken to avoid

unnecessary risk of consuming unidentified wild mushrooms. Comprehensive awareness campaigns by health workers in rural areas and forested belts needs to be encouraged against accidentally consuming poisonous fungal species. Local forest officials and staff members, school teachers, post offices, rural banks, health centers and census staff members should also be used in this awareness campaign in remote rural areas to inform people about mushroom poisoning. NGO members involved in promoting health and education in such areas should also be trained, funded and educated to include awareness campaign about dangers of mushroom poisoning.

Dr. Saikat Kumar Basu
UFL, Lethbridge AB **Canada**
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Congratulations on 22nd foundation day of ISEB. Special congratulation to ISEB office staff for their efficient management of the entire function.

Dr. B.P. Singh
Former Scientist 'H' and Emeritus
Scientist CSIR
Gomtinagar, Lucknow, **India**
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I wish a very successful and excellent future for the ISEB. May this Society come up with more society-oriented innovation and initiatives to make the better nation for tomorrow.

Mr. Rama Kant Dubey.
Institute of Environment and
Sustainable Development,
BHU, Varanasi, **India**
ramakant.sls@gmail.com

Greetings for the 22nd Foundation Day of the International Society of Environmental Botanists, CSIR-NBRI, Lucknow. I am very happy that you have kept this Society active through your utter dedication. With best wishes for the success of your efforts, I send you my congratulations.

Dr. H.Y. Mohan Ram
Former Professor, University of Delhi
Delhi, **India**
hymohanram@gmail.com

Thank you very much for the invitation for the 22nd Foundation Day function. This is to wish you a very successful Foundation Day, Thanks for all your efforts.

Dr. C.R. Bhatia
(Former Secretary, Department of
Biotechnology Government of India)
Navi Mumbai, **India**
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Congratulations for the 22nd anniversary of ISEB. I wish I could attend the event. Wish fruitful work to continue forever.

Prof. Sharad Chaphekar
Ex-Professor, IISc, Mumbai, **India**
sharad.chaphekar@gmail.com

Thanks Dr. Ahmad. I am away and hence will be missing the function. Sorry. My best wishes for the success of the 23rd Foundation Day Function.

Dr. P.V. Sane, FNA
(Former Director, NBRI & Founder
President ISEB), Mahanagar,
Lucknow, **India**

Thank you for the invitation for the 22nd Foundation Day of International Society of Environmental Botanists (ISEB) on 22nd December, 2016.

Prof. Palpu Pushpangadan
(Former Director, CSIR-NBRI)
Amity Institute for Herbal and
Biotech, Ravi Nagar, Peroorkada,
Trivandrum, Kerala, **India**
palpuprakulam@yahoo.co.in

I am interested in attending the Foundation Day Celebration of ISEB to be held on 22nd December and would like to come by air to Lucknow. It is from the core of my heart that I wish to attend this historical day in my life time. It will give me an opportunity to be present in Lucknow for this auspicious day.

Dr. Vinod Bala Yadav
Patron Member, ISEB
Ex-Assistant Professor, GDHG PG
College, MBD, Dehradun, **India**
vinodbala.yadav@gmail.com

My heartiest good wishes are for the ISEB, which is running in a good pace since it has started. My compliments are to all office bearers, who took the Society to a consistent path of significant growth.

Prof. Madhoolika Agrawal, FNASc,
Head, Department of Botany
Banaras Hindu University
Varanasi, **India**
madhoo.agrawal@gmail.com

Greetings and Happy New Year -2017. Congratulations on 22nd Foundation Day of ISEB. My good wishes are with you and the Society.

Prof. Javed Ahmad
Prof. of Botany, Hamdard University,
New Delhi, **India**
javedamd@hotmail.com

Thank you very much for your invitation. I would like to attend the programme.

Mr. A.A. Naqvi
Former Managing Director,
National Backward Classes Finance &
Development Corporation,
New Delhi, **India**
naqviamd@gmail.com

Heartly congratulations on the 22nd Foundation Day of the International Society of Environmental Botanists. The growth and progress of ISEB has been impressive and it has carved out a niche for itself among scientific community and society both nationally and internationally. I am certain the future journey of the Society will be even more exciting and illuminating. The present and the past office bearers of the Society deserve our deep appreciation for their untiring hard work and dedication. My sincere good wishes for a Happy New Year to the members and all the functionaries of ISEB.

Prof. C.K. Varshney
(Former Vice-President of ISEB &
Professor Emeritus (JNU) &
Distinguished Adjunct Professor (AIT,
Bangkok) 88, Vaishali, Pitampura,
Delhi-110034, **India**
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Thanks for the invitation. Salutations to your dedication on successful 22 years in the service of the Society. Unfortunately, we shall be missing the occasion. Both of us are proceeding on travel away from Lucknow just now.

Deep regards and best wishes for the success of the occasion.

Dr. Umesh Lavania, FNA,
Farmer Chief Scientist, CIMAP,
Lucknow, **India** &
Prof. Seshu Lavania
Head, Department of Botany
Lucknow University, Lucknow, **India**
lavanaiuc@yahoo.co.in

We express our heartfelt gratitude for your interest in International Conference on Environment Management and Sustainability (ICEMS 2017) that is being organized from 4th to 6th January 2017 at our Nerul

Campus. The conference is sponsored by Science and Engineering Research Board, Ministry of Science and Technology, Govt; Council of Scientific and Industrial Research, Defence Research and Development Organization and Jawaharlal Nehru Port Trust.

We have received immense response from researchers, academicians and students for presentation and participation in three day event. Around 120 research papers are scheduled for presentation under plenary lecture, invited lectures, contributory oral presentations and poster presentations, respectively. We are thankful to you all for supporting us by accepting our invitation for lectures and reviewing of papers. With great honour we invite you all to participate in the event. For more details visit at www.siesiiem.edu.in. Merry Christmas and Season's Greetings for New Year 2017.

Dr. Seema Mishra, Director
SIES Indian Institute of Environment
Management Nerul,
Navi Mumbai, **India**
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At the outset, I offer you my heartiest greetings and best wishes for the New Year 2017.

Let me then inform you that the **Cambridge Scholars Publishing, UK**, has inducted me in their Editorial Advisory Group for Agricultural and Biological Sciences. I am expected to make initial assessment of publishing proposals received in the above-mentioned areas of science, and advise the Publishers on the suitability of the proposal for consideration.

The authors/editors willing to develop a book proposal on subjects of biology or agriculture for submission to 'Cambridge Scholars Publishing' may contact me for any possible help regarding the proposal. They may also contact me for information related to terms and conditions of publishing agreement, using my e-mail ID.

Prof. M. Iqbal, PhD, FNASc,
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NEWS FLASH

Dr. Amit Pal, Assistant Professor, Institute of Environment & Development Studies, Bundelkhand University, Jhansi and Former Editor of EnviroNews has been awarded ARCHANA GOLD MEDAL – 2015 for his research contribution in Environmental Sciences and Toxicology by **Dr. Manju Sharma** former Secretary Department of Biotechnology, Government of India on the occasion of **36th Annual session of Academy of Environmental Biology** and National symposium on “**Impact of emerging toxic chemicals on Humans, plants, Diseases and Sustainable Development – IETC-2016**” during November 25 – 27, 2016 at Hamdard University, New Delhi.

WELCOME NEW LIFE MEMBERS

Prof. Poornima Vajpayee, Professor, Department of Botany, University of Lucknow, Lucknow.

devpoornima@rediffmail.com, poornimavajpayee@rediffmail.com

Dr. Bhawna Sharma, Associate Professor, Department of Botany, Sri Shakti Degree College, Sankhahari, Ghatampur, Kanpur.

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Prof. Rupam. Kapoor Professor, Department of Botany, Delhi University, Delhi.

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Proceedings of 22nd Foundation Day of International Society of Environmental Botanists

Shivani Srivastava and Nandita Singh*

*Consultant Scientist

Plant Ecology and Environmental Science Division
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22nd Foundation Day of International Society of Environmental Botanists (ISEB) was celebrated on 22nd December 2016 at CSIR-NBRI Auditorium. On this occasion a programme was organized by International Society of Environmental Botanists (ISEB) in which Prof. (Dr.) Gourdas Choudhuri, Executive Director & Head, Department of Gastro-enterology & Hepato-biliary Sciences, Fortis Medical Institute, Gurugram, Haryana was the Chief Guest. Prof. S.K. Barik, President, ISEB and Director, CSIR-NBRI presided over the function.

At the beginning of the programme Dr. K.J. Ahmad made a brief historical account of the ISEB and its contribution during the past 22 years. ISEB was founded on 3rd December 1994 with just 28 members which has now increased to 450

members both from India as well as abroad. He informed that till date total 88 issues of ENVIRONNEWS have been published by the ISEB. ISEB has organized 5 International conferences (ICPEP), where more than 100 overseas delegates were also the participants. The ISEB has been organizing many outreach activities for environmental awareness. He felt proud to declare that very reputed members are associated with the ISEB such as VCs of universities, directors of institutes, professors and faculty of universities, judges, environmentalists etc.

After that, the second issue of “International Journal of Plants & Environment”, a journal of ISEB, was released jointly by Prof. S.K. Barik and Prof. G. Chaudhuri. Along with them Prof. R.S. Tripathi, Dr. K.J. Ahmad, Dr. S.C. Sharma, Dr. R.D. Tripathi (Chief Editor of the Journal) and Dr. Nandita

Singh (Co-Chief Editor of the journal) were also on dais.

It was followed by a brief introduction of Prof. S.K. Barik, President ISEB and Director CSIR-NBRI by Prof. R.S. Tripathi. He emphasized that Dr. Barik has been leading a strong group of research at NEHU pursuing frontline research in diverse areas such as plant diversity including inventorization, bio-prospection, conservation of threatened species, ecological modeling, eco-restoration of degraded ecosystems, climate change, regeneration of forests etc. Prof. Barik has published > 70 research publications and 11 books as an author, which are cited extensively worldwide. He has been serving as Chairman/Member of several Expert Committees/Task Forces constituted by Ministry of Environment, Forests and Climate Change (MoEFCC), Planning

Commission, Department of Biotechnology (DBT) etc. At the end Prof. R.S. Tripathi wished him good luck for the future.

Following this Dr. S.C. Sharma, Vice-President of ISEB, introduced the Chief Guest, Dr. Gourdas Choudhuri, as a leading gastroenterologist, medical educator, researcher and columnist of national eminence, with rich experience of over 30 years in the medical profession. He is currently Director and HoD, Gastroenterology & Hepatobiliary Sciences, at Fortis Memorial Research Institute in Gurgaon. He also told that over the years, Dr. Choudhuri has been widely recognized in his field and was the recipient of several honours and awards. Dr. Choudhuri has served as Council member of international bodies such as the World Gastroenterology Organization (WGO), Asia Pacific Association of Gastroenterology (APAGE) and Coalition for Eradication of Viral Hepatitis from Asia Pacific (CEVHAP). He has also been a Fellow of the World Health Organization (WHO) for Health Promotion.

This was followed by foundation Day lecture by the Chief Guest, Dr. G. Choudhuri on the topic **“Environmental Effect on Human Health – Searching for local solutions”**. During the presentation Dr. Choudhuri started with the Microbial

age 1879-1990, when most research was focused on microbes and disease. Then he asked the audience what were the major causes of death in India? As a reply he answered himself that Heart disease, malignancy and stroke were the main causes of death. He said that about 65% of deaths are non-microbial in India. Then he told that after Microbial phase came the Genomic phase for health and diseases. According to him some diseases are purely genetic diseases for example Retinoblastoma, Huntington's disease but many genetic disorders result from gene changes within the body due to inborn errors of metabolism. After Genomics he shifted the attention to Environment and Health. He said that Pollution was the major cause of many diseases. Some pollutants may be natural cause of disease like cholera and arsenic toxicities, whereas some may be due to consequences of human habitation like global warming, natural disasters. Further major causes are the man made pollutants which are causing serious diseases these days. He gave the example of air pollution caused by burning of crops etc. which has been cause of many respiratory diseases in cities of North India this winter. He said that type of environment is very necessary for living beings. This also includes the internal environment which causes diseases like Schizophrenia and depression. In a

healthy environment people feel happy and happy persons live longer. Dr. Choudhuri emphasized that the balance in lifestyle may cure a number of health problems. He also gave a glimpse of the importance to plants in mitigating the pollution and keeping the environment healthy. In the end Dr. Choudhuri introduced the audience about his non-profit organization “HOPE Initiative” which aims at creating awareness on health and environment related issues in students and tries to reach out to the community through the school-to-community approach.

This was followed by Presidential remarks by Dr. Barik. He thanked Dr. Choudhuri for his very informative presentation. He also agreed that maximum environmental problems can be resolved by plants. He said that every person should do plantation and promote others to do so. Dr. Barik emphasized on collaborative research through which we could get good technology and products.

As a token of love from CSIR-NBRI, Dr. Barik presented a plant based memento to Dr. G. Choudhuri.

The programme was conducted very diligently by Dr. Seema Mishra.

The Foundation Day celebration was capped off with the Vote of thanks by Dr. R.D. Tripathi, Additional Secretary ISEB.

Free Air Concentration Enrichment Facility (FACE)

Vivek Pandey

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The anticipated increases in global atmospheric CO₂ concentrations have led to much research that aims to determine the growth of plants when exposed to the levels of CO₂ predicted for the latter part of this century. The free air CO₂ enrichment (FACE) technique has been successfully used to grow a wide variety of vegetation

types like wheat, pastures and trees under elevated CO₂. Compared with methods that grow plants under elevated CO₂ in enclosures, the main advantage of FACE is that it does not substantially modify environmental factors such as incident solar radiation, temperature, humidity and wind, which can influence the response to

elevated CO₂. Generally, FACE systems enrich a circular area of vegetation with CO₂ in order to generate a zone with a higher CO₂ than that of the surrounding ambient atmosphere. The CO₂ is usually emitted from a structure (commonly referred to as a ring) constructed from pipes or tubes that surrounds the vegetation and is



Fig 1. FACE system at NBRI garden. A: FACE rings and B- control room.

dispersed across the vegetation by the wind.

The NBRI FACE facility consists of three hexagonal CO₂ enrichment rings together with their three companion ambient (non-enrichment) rings (Fig 1 A). The ring has a diameter of 10 m. Each FACE ring is made up of 6x3 m long G.I. pipes. Each horizontal tube is grounded in soil. Each horizontal arm is fitted, at three points, with 5 m vertical pipes. These vertical pipes have nozzles to release CO₂ inside the ring. CO₂ is supplied through 30 kg cylinders fitted with pre-heaters. 300 litre capacity of air compressors (3 nos.) are used to pump air mixed with CO₂ into FACE ring through GI pipes. Six solenoid valves are used for each arm of FACE ring and one valve is for main CO₂ line, therefore total seven solenoid valve used to control CO₂ release inside the ring. The CO₂ concentration inside the ring is sampled at 3 places and fed to the infra red gas analyzer. Before being fed to the analyzer, air is passed through a desiccant and filter to remove moisture and particulate matter, respectively. In the middle of the ring sensors for wind speed and direction,

temperature, humidity, light intensity and CO₂ are mounted. Signals from these sensors are transmitted toward control room through four core shielded cable. Fully automatic control system (SCADA) for monitoring and regulation of desired CO₂ works with inputs from the CO₂ analyzer, temperature and anemometer (Fig1B). The control system is operated with microprocessor through in-built timer and data logger input. On line display of temperature, humidity, CO₂ concentration in ppm and air velocity is integrated with necessary controls and monitoring station controller. The systems have memory backup and real time clock combination and single window operation to monitor temperature, humidity, CO₂ level and air velocity with direction.

In one of the experiments at NBRI, wheat plants were grown in Free Air Concentration Enrichment (FACE) rings. Three rings were supplied with elevated CO₂ while other 3 rings served as control (supplied with air). CO₂ enrichment was started after seed germination and continued until final harvest. The targeted CO₂

concentration was reached to about 470 ppm. Higher photosynthetic rate (A) rate was observed at vegetative stage than at flowering stage and A was more in eCO₂ at both the stages. Similar responses were found in stomatal conductance. A/Ci curve indicated that photosynthetic acclimation was almost similar at both the stages in both the treatments. Increased shoot biomass was found in plants grown under eCO₂. All the yield parameters also showed upward trend under eCO₂, including grain wt/plant, 1000 grain wt and Harvest Index. The average yield of Kundan variety has been reported to be 40-45 Q/hectare. We found that in control plants, estimated yield was 44.48 Q/hectare while in eCO₂ it was 56.3 Q/hectare.

Wheat grain proteomics showed that out of 49 differentially expressed proteins, 24 were up-regulated and 25 were down-regulated in grains under eCO₂ condition. Through mass spectrometry 33 proteins were identified and functionally characterized. They were found to be involved mainly in carbon metabolism, storage, defence and proteolysis. Gluten proteins are normally associated with superior end quality, especially dough strength and elasticity. There was more expression of high molecular wt glutenin and LMW glutenin proteins in eCO₂ wheat grains. Differences in glutenin ratio in wheat seeds might have an adverse impact on bread dough end-product quality. Further studies are going on with more wheat varieties.

TRANSBOUNDARY POLLUTION

Five EU countries whose coal power plants do the most harm to their neighbouring countries are: Poland (causing 4,690 premature deaths abroad), Germany (2,490 deaths), Romania (1,660 deaths), Bulgaria (1,390), U.K. (1,350). In 2013 air pollutant emissions from coal-fired power stations in the European Union were responsible for over 22,900 premature deaths, tens of thousands of ill health from heart disease to bronchitis, and up to € 62.3 billion in health costs.

Food Security vs. Environment

C. R. Bhatia

(Former Secretary, DBT, Govt. of India, New Delhi)

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It is widely accepted that cultivation of crops in the Indian subcontinent dates back to 9000 years before present. Growing crops was made possible only after clearing of grasslands at the river banks, and forest land in the interior. Cattle and other animals were domesticated for milk and farm operations. Human existence as nomadic hunter and food gatherer gradually changed to farming and to a more settled way of life which is now recognized as the Indus civilization. Urbanization followed. These changes must have caused lot of environmental perturbations such as the loss of natural vegetation, and biodiversity, as we know today. As the productivity declined by growing crops on the same plot, keeping the land fallow to return back to natural vegetation and restoring fertility were practiced. Later, crop rotations with legumes, and green manuring were followed. Cow dung was added to the fields to increase productivity. This kind of agriculture was practiced in the country during the Mughal (1526-1700) and British (1750-1947) rules. In the industrialized countries crop productivity increased significantly after the development of Haber – Bosch process to fix atmospheric nitrogen, abundant in air, into ammonia widely used as nitrogenous fertilizers. Consumption of synthetic fertilizers in India at the time of independence was less than 70,000 tons compared to over 12 million tons in 1915, all indigenously manufactured.

Famines were of frequent occurrence; 14 major famines were recorded between 11th and 17 centuries (See Bhatia, 2003). The Bengal famine of 1940-43 was the last major one, where estimated 1.5 - 4 million human lives perished. Since then, under the British rule and after independence in 1947, food shortages were widespread till 1970s. Import of food grains and public distribution averted famines. Introduction of semi-dwarf, nitrogen

responsive wheat and rice cultivars in the 1970s, the so called green revolution technology, changed the scenario. Currently, country is nearly self-sufficient in food. At the same time, it is home for a very large number of undernourished children. Hidden hunger, micro-nutrient deficiencies and poverty are widespread. Cultivated land area of about 140 million hectare has not changed in the last forty years.

The green revolution technology, besides enlarging food availability through increased productivity, augmented the income of farm families and contributed towards better health care, and education for their children. Increased supply prevented the extensive rise in food prices that helped the poor landless in rural areas and the urban poor to access food with their limited earnings. It also prevented cutting down of natural forests to bring additional land under cultivation to meet the food requirements of the growing population. At the same time, it is recognized now that the input intensive green revolution technology that contributed to self sufficiency in food production has caused adverse environmental effects. Improper use of inputs has resulted in some degradation of the resource base – soil, water and environment. At present, it is manageable. However, the demand for more sustainable production are increasing.

Sustainable food production is possible only for a sustainable population. Some tradeoffs between food needs and environmental concerns have always been accepted, like in many other human activities. Even the hunter and food gathering ancestors must have faced the same dilemma. The question remains of priorities that we set. Do we wish to see people dying due to lack of food and dead bodies lying on the streets? Even the most hard core environment supporters who are highly critical of the green revolution technology with

chemical fertilizer and pesticide inputs would not like to see the repeat of Bengal famine of 1943. Therefore, the current priority should be to produce enough to meet the basic food needs of the growing population with minimal environmental damage. Hence, the question—to what extent the environmental tradeoffs are acceptable at present? The environmental impact is best illustrated by the well known IPAT equation given by Ehrlich and Holdern (1971): Environmental Impact (I) = Population (P) x Affluence (A) x Technology (T)

Reducing demand

Population and affluence determine the demand that includes a large component of food wastage. The priority based on the above should be to reduce demand which is the product of population and affluence. Demand can be reduced by curbing population growth rate and reducing waste of food. Both are doable, but need a change in the mindset and life style. Ostentatious living and vulgar display of wealth at social and family events need to be restrained. Change in the mindset, and life style would be necessary for this. Economic growth and affluence are the main aspiration of the population in a poor country and need promotion. Affluence with simple lifestyle and food by choice can prevent escalation of demand.

Technology

Science and improved technology alone can provide acceptable solutions to the environmental problems. There is a great opportunity for agronomists and environmental botanists to join hands together for overcoming the adverse environmental effects. Monitoring of the environmental impact of the production technology, can reduce most of the adverse environmental effects. Further, agronomic practices can be developed to minimize nitrogen run-off from field and soil degradation due to the accumulation of pesticide residues.

Plastics and the Environment

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Scientists have termed plastics as a marvel of modern chemistry. They have declared discovery and development of plastics as one of the greatest achievements chemistry has ever made.

Development of Synthetic Plastics (henceforth termed as 'plastics') began during the second half of Nineteenth Century, close to the time when industrialization began in the Europe and slowly in rest of the world. By the middle of Twentieth Century many major scientific discovery and inventions took place in the development of many types of plastics although the volume remained at a low sphere. However since around 1970's, the volume of production of plastics materials increased at a very fast rate and by 2015 the production at a level of around 250 million Tons is close to that of Steel on the basis of surface area covered.

Plastics have gained widespread applications from the common household goods to high technology instruments. Plastics have made significant contribution in the area of medical safety and health care. Light weight yet tough, inert, excellent barrier properties, ease of processing into flexible or rigid products, transparency when desired, low consumption of energy during its production and transportation - all these attributes have made plastics an inseparable entity of the modern human life. Plastics reduce the emission of green house gases and leave lesser Carbon Footprint on the earth compared to the alternative materials. Plastics save green house gas emissions and save the earth from global warming. Use of plastics in Piping, Automobiles, Insulation and Packaging applications saved the earth from Green House Gases to the tune of about 1.0 GT in the year 2005. (McKinsey study for ICCA - International Council of Chemical

Associations).

Plastics pipes consume least electrical energy to discharge equal volume of irrigation water for agricultural purpose compared to pipes made of alternate materials. Plastics have replaced wood in many application areas saving millions of trees from felling. Packaging is the single largest application area of plastics. Positive attributes have clearly established 'preferred' status for plastics in packaging. Protection, preservation, light weight, hygiene, cost effectiveness, ease of availability, its amenability to be produced indifferent forms, sizes and shapes and many others, make plastics an ideal material of choice for food as well as non-food packaging.

Although plastics are employed in myriad applications where they actually conserve natural resources, there are some issues which have been surrounding the material ever since its growth rate increased.

First it is said that plastics are derived from nonrenewable resources, viz. oil and hence the usage of plastics should be curbed.

The reality is that only about 4% of crude oil is used in the entire chain of petrochemicals of which plastics is only a part. Moreover use of light weight plastics materials in various applications including in automobiles, reduces the consumption of fuels to such an extent that it more than compensates its use of the crude oil for its production. While the economy of usage of crude oil is always welcome, curbing the use of plastics is not the solution.

The second aspect of criticism relates to the alleged health hazards arising out of usage of plastics.

Plastic products are being subjected to in-depth scientific analysis and they have clearly proved that plastics do not cause any health hazard. In fact plastic products have been

implanted into vital organs like heart valves clearly disproving the myths. Plastics are used for packaging of live saving blood and vital pharmaceutical products. Plastics Disposable Syringes inject the live saving drugs into human and animal bodies. There are clear international and national regulations / standards for usage of plastics that comes into contact with food stuffs, pharmaceutical products and drinking water etc. Therefore, much of the alleged health hazards are pure scare mongering and not based on scientific facts. The issue of dioxin emission during the processing / burning of plastics has also been studied and documented to indicate that plastics and dioxin are not directly related. It is also documented that air and water emissions of various gases and other products during the production of plastics are much lesser compared to the alternative materials for same applications

The third major criticism is its non-biodegradability.

While it is true that plastics are not amenable to biodegradation like other organic matters, many alternate materials such as glass, metals are also not biodegradable. Moreover, many of the applications for plastics arise from the need for the product to be long-lasting. Again, LCA and other studies carried out the world over clearly prove that the energy required for production of plastics is much lower than that of alternate materials. Thus the production and usage of plastics demand minimum energy in comparison to other materials and therefore non-biodegradability alone cannot be a consideration while deciding on the appropriate needs of a material.

Biodegradable / Compostable Plastics have been developed since as early as in the Seventies (1970's). In fact most of the major manufacturers of conventional plastics raw materials

from Natural Gas, also manufacture compostable plastics for limited and specific applications which are difficult for recycling; for example mulch film in agricultural application. It is evident that the degradation / composting process releases carbon dioxide in aerobic condition and methane and carbon dioxide in anaerobic condition. Both the situations are not desirable as both carbon dioxide and methane are greenhouse gases. Conventional Plastics recycling do not create such situation. Recycling is preferred compared to biodegradation / composting due to fact that recycling help resource management. Compostable Plastics do not degrade or disappear in to the soil of its own. It will remain in the open environment if not treated appropriately. Moreover, composting takes several months even when handled properly. Some other type of degradable plastics has not been established as environment friendly.

All these reasons have resulted in keeping the production / demand for compostable / biodegradable plastics at a miniscule level compared to that of conventional plastics world over.

Lastly, management of plastics waste is held against the usage of plastics. Plastics are blamed as the major cause of Solid Waste problem.

Undoubtedly this is a serious issue mainly due to the poor littering habit of general mass and inadequate infrastructure for management of solid waste. Due to this we find all types of dry waste including plastic waste littered in our surroundings. Even wet waste also is found littered around the street corners and Plastics and the Environment elsewhere. The reality is that plastics waste form much less than 10% of the MSW stream in major Indian cities. There is no problem of disposing the plastics waste when it is

collected in segregated form at source of waste generation. Plastics waste can be 100% recycled by one process or other. Very thin plastic bags, though recyclable, are often left behind by the waste pickers when littered due to economic reason. These very light weight plastic film waste do not pay a reasonable return to the waste pickers and hence they avoid picking these up. In India, rigid plastics waste do not create any waste management issue, as these are collected by the waste pickers in the informal sector for selling to the waste dealers / recyclers for earning their livelihood. To avoid the problem of flexible plastics waste management, MoEF, Government of India has come up with Rules restricting the thickness of plastic carry bags. Manufacturers and users of multilayered plastics packaging materials have been assigned the responsibility for assisting the civic bodies for setting up collection centres for plastics waste. It is required that the government rules are implemented effectively.

Another most important issue is the plastics waste in the sea and river water. Marine litter is found in all oceans in the world – not only in most populated areas but also in area far away from the obvious source of plastics waste. According to the United Nation's Joint Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP), land based sources account for 80% of marine pollution, rest being from the ships. Although there is conflicting figures on the volume of marine plastics waste pollution, however there is no denying that the problem is definitely serious. There are concerns on how to avoid the marine pollution. Illegal dumping, proper education on anti-littering near the sea beaches are among the challenges. Recovery of plastics waste from the

oceans also is possible and is actually practiced in case of larger floating waste. More and more attention and efforts are required to address the issue. The real solution lies in the segregation of dry and wet solid waste at the source, creation of efficient solid waste management infrastructure coupled with establishment of recycling centres as plastics can be recycled to produce articles of critical and non – critical applications for mass use augmenting the concept of resource management.

Apart from the conventional Mechanical Recycling process, alternate processes of plastics recycling also are required to be encouraged. Feedstock Recycling and Energy Recovery are very important technologies. Low-end plastics waste, which often is abandoned by the waste pickers and conventional recyclers for difficulty in segregation and cleaning, thus creating a waste management problem, can be disposed of safely by co-processing in cement kilns. Industrial fuel can be produced from all types of plastics waste by pyrolysis process. Plasma recycling process can resolve the issue of disposal of domestic hazardous waste like sanitary napkins, baby and adult nappies. Plastics waste can be used as an efficient reducing agent for the manufacture of steel. Plastics waste has been used to construct better quality asphalt roads. All these processes have been successfully tried and established. Government of India has made it mandatory to use plastics waste as per specifications laid down by Indian Road Congress for constructing all bitumen roads in the country. Use of plastics waste in co-processing in cement kilns has been approved by the regulatory authorities.

Distinguished Scientist visits ISEB office

Prof. R. K. Kohli, Vice-Chancellor, Punjab Central University, Bathinda, Punjab visited International Society of Environmental Botanists (ISEB) on 10th January 2017 and had useful discussions with the officials of ISEB.

NEWS AND VIEWS

Traffic-related air pollution has negative impact on school-age children

The traffic-related air pollution is a developmental neurotoxicant – a factor that disrupts brain development. Experts pointed out that many schools are located next to heavily-traveled roads where traffic-related air pollution levels peak when school is in session. Therefore, researchers wanted to determine the impact such exposure might have on children's cognitive development. In a prospective cohort study (the BREATHE study), PLOS Medicine notes that "the researchers assess whether exposure of children aged 7-10 years to traffic-related air pollutants in schools in Barcelona, Spain, is associated with impaired cognitive development." The researchers surmised, children who attended school in areas where high levels of air pollution caused by traffic existed were indeed impacted, and not favorably. The journal notes that there was an 11.5% 12-month increase in working memory at the lowly polluted schools but only a 7.4% 12-month increase in working memory at the highly polluted schools. In fact, all cognitive areas were found to be affected. Other analyses indicated that children attending schools with higher levels of traffic-related air pollutants in either the courtyard or in the classroom experienced a substantially smaller increase over the 12-month study in all three cognitive measurements than those attending schools with lower levels of pollutants.

People should use public transportation rather than individual vehicles when commuting to work. As such, the problem of traffic pollution can be reduced, potentially alleviating exposure for those in nearby areas, such as schoolchildren. The issue of traffic-related air pollution is a concern in a large number of areas.

In parts of the UK, studies have found that otherwise healthy people who were exposed to bus and taxi fumes for a two-hour time period experienced damage to their arteries. In Canada, it's estimated that air pollution is linked to approximately 21,000 premature deaths annually, while in the United States, road transportation emissions is believed to cause about 53,000 premature deaths every year. In Beijing, the number of vehicles has increased to 5.18 million from 3.13 million in early 2008 alone. Beijing is also home to many eight-lane roads, which typically are lined with heavy traffic and the detrimental pollution that comes with it.

Source: <http://www.sciencedaily.com>

Temperature drives biodiversity

The diversity of plants and animals in Earth's arctic regions is moderate. Tropical latitudes in contrast are teeming with different species where new organisms are being discovered all the time.

What is the cause of this uneven distribution? Why are the tropics home to more species than higher latitudes? "This question has intrigued ecologists for some time.

To date, this core question has been subject to controversy. One hypothesis, for instance, is that the primary productivity of a habitat is ultimately decisive for the number of species living there. Another hypothesis assumes that the rate of evolution and speciation depend on temperature. According to this assumption, more species thrive in a warmer climate than in a cold one.

So far, these hypotheses have been examined usually by focusing on selected groups of species: For example, the studies observed only birds, bees, ants or ferns and analyzed their diversity in different regions of the world, e.g. in North America, Europe or along elevational gradients in the Alps.

Some studies supported one hypothesis, whereas others backed another assumption. It is still a long way from establishing a "general rule" which ecologists are aiming for.

In the journal "Nature Communications" Peters and the team of the Research Unit "FOR1246" funded by the German Research Foundation now present a new study which is unique so far and is the synthesis of four years of working: "On Mount Kilimanjaro, one of Earth's largest climatic gradients, they observed so many animal and plant groups in parallel as never before.

Overall, the team examined eight groups of plants and 17 groups of animals, from bees to bats. The researchers had to climb in mountainous areas for several days to reach the highest study sites.

The area of study stretched from the savannahs at the foot of the mountain to the habitats at an altitude of 4,550 meters that barely sustain plants. The data across all groups were collected over the same areas and in the same period of time, respectively. "This approach allowed them to not only analyze the biodiversity of each individual group, but also that of whole communities."

The study revealed that biodiversity in communities is mainly determined by temperature. The warmer it is, the greater the diversity. The more groups of animals and plants you investigate in parallel, the greater the significance of temperature for explaining biodiversity, whereas the importance of all other variables decreases accordingly.

The scientists believe that this is strong evidence supporting the assumption that temperature is actually more decisive for distribution patterns of overall biodiversity than productivity or size of habitats.

Source: <http://www.sciencedaily.com>

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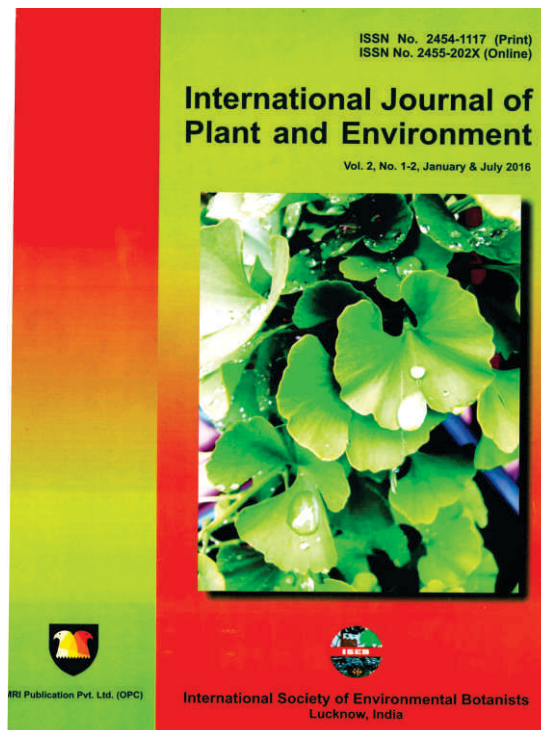
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**International Conference on Emerging Trends in
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Email: gogreen@bioleagues.com
Website: [http://bioleagues.com/conference/
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**7th International Conference on Environmental
Science and Engineering (ICESE 2017)**
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Contact person: Ms. Iris Tang
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<http://www.wessex.ac.uk/conferences/2017/ecosud-2017>

**5th International Conference on Waste
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Contact person: Alissa Matthew
Email: ed@eachbee.org
Website: <http://wmebs.eachbee.org/>

**13th International Conference on Envirotech,
Cleantech and Greentech (ECG),**
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Convener: Dr Vivian L
E-mail: info@wasrti.org
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BOOKS

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Price: \$ 193.00

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Springer 2016
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