ENVIRONEWS

INTERNATIONAL SOCIETY OF ENVIRONMENTAL BOTANISTS

Newsletter

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IN THIS ISSUE

NEW PRESIDENT OF ISEB

Dr. K.C. Gupta, who took over as new President of International Society of Environmental Botanists is a distinguished environmental toxicologist and a biogenic chemist of the country. Currently he is director of IITR, Lucknow. Dr. Gupta was earlier Acting Director of Institute of Genomics & Integrative Biology (IGIB), New Delhi. Dr. Gupta was a recipient of prestigious DAAD Fellowship (Germany, 1982-1984), CSIR-DAAD Exchange Fellowship (1991-1992), Indo-German Exchange Fellowship (2005), Indo-French Exchange Fellowship (1996), Indo-Israel Exchange Fellowship (1998), Indo-Japan Exchange Fellowship (2009-2010) and is a Fellow of National Academy of Sciences, Allahabad. He is a widely travelled scientist and was Visiting Scientist/Professor at several universities/institutes such as University of Marseilly and Paris, France; University of Kiel and Ulm, Germany; Bar-Han University, Israel and RIEKEN, Japan.

Dr. Gupta's areas of specialization are bio-organic chemistry, nucleic acid synthesis and design. His current area of research relates to development of nano-particle aided transfection reagents for delivery of genes and their toxicity assessment and development of biochips as diagnostic tools for detection of genetic diseases.

He has published 90 research papers in internationally reputed peer reviewed journals and contributed to 10 invited reviews and book chapters. The impact of Dr. Gupta's work can be judged by >800 citations and he has to his credit 17 patents granted nationally and internationally with successful transfer. He is serving as Chairman/Member of a number of national and international scientific committees. He has guided 14 students for their Ph. D. programme and an equal number are pursuing their doctoral programmes under his guidance.

- **Members of ISEB are requested to immediately intimate any change in their contact address including postal, Email, Fax, Telephone to ISEB office.**
- All correspondence should be addressed to : **The Secretary, International Society of Environmental Botanists,** National Botanical Research Institute, Lucknow - 226 001 (India).
- **E-mail : isebnbrilko@sify.com** • **Website :** http://isebindia.com

LETTERS

It is very nice of you to send Environews published by The International Society of Environmental Botanists, which carries a good deal of new information, proceedings of expert meetings and articles by leading scientists. I not only gain personally by the contents but convey some of the items to students and general public.

I am presently editing the Platinum Jubilee Volume of the Indian National Science Academy with the past President of INSA and the noted neuro-surgeon Prof. P.N. Tandon. We wish to site a few items from the paper published by Professor R.S. Tripathi, INSA Senior Scientist, working in NBRI. I am seeking your permission for this purpose. My paper is the last one to be readied and it has to be rushed in two days. Please send an immediate reply. Thanking you and remembering the long association we have had for several years.

HY Mohan Ram, INSA Honorary Scientist,
New Delhi, **India**
E-mail: hymohanram@gmail.com

I would like to tell you about a new project in Egypt . The title of the project is "The new Nanoremediation methods and phytoremediation as using hyperacumulator plants to clean up the contaminated soil around River Nile in Egypt" the Zagazig university in Egypt will pay all the cost of research.

I will be very glad for your participation with me in this scientific project. In that case , can you address your scientific opinion to me as soon as possible please. Really, I need your perfect technical supports.

Prof. Nabil M. Abd El Rahman SOLIMAN
Departement Plant Physiology & Plant Pathology.
Zagazig University, **Egypt**
E-mail: soliman.nabil@yahoo.fr

Hope all is well. I was away in Mexico teaching for three weeks, followed by travels to project meetings. I am the Co-Principal Investigator of a million $ research project in the Alberta Oil Sands, Canada over the next two years. I have assembled some 9 experts ranging from plant science to atmospheric science as the research team. There is an article on the Oil Sands in National Geographic, 2009 December Issue (You can access it through Google).

You might remember that I had suggested Dr. Fitzgerald Booker from USDA as an invited speaker. He needs a letter of invitation from you or from Dr. Tuli as soon as possible. An official signed latter can be sent electronically. He can make a presentation on: The Ozone Component of Global Change: Effects on Agricultural and Horticultural Plant Yield, Product Quality and Interactions With Invasive Species.

Prof. Sagar Krupa
Prof. Emeritus, Department of Plant Pathology
495 Borlaug Hall, University of Minnesota
1991 Upper Buford Circle, St. Paul, MN 55108, **USA**
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Thanks for the latest ISEB newsletter, January 2010. As a social worker and consumer activist, I congratulate you for this informative issue. I wish for successful ICPE-4 to be organized by NBRI & ISEB in December 2010.

Vijay Acharya
Founder President, Bharat Jyoti, Lucknow, **India**
E-mail: bharat.jyoti@yahoo.co.in

By the appointment of our Secretary of Agriculture, I have been a member of the USDA National Agricultural Air Quality Task Force (AAQTF) for the last four years. The Task Force members discuss the science, the policy and the conservation of agriculture relative to air quality and climate change. There are two members in the Task Force that can contribute significantly to the scientific content of ICPEP-4.

In case you wish to invite them to ICPEP-4, you may contact them at the following addresses:

Dr. Cynthia L. Cory
Director, Environmental Affairs
California Farm Bureau Federation, CA 95814, **USA**
E-mail: ccory@cfbf.com,

Dr. Raymond Knighton
National Program Leader, Air Quality and Climate Change
NIFA, National Institute for Food and Agriculture
Washington, DC, **USA**
E-mail: rknighton@csrees.usda.gov

Prof. Sagar V. Krupa
USA

WELCOME NEW MEMBERS

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Life Members

Dr. A.K. Asthana is Assistant Director and Group leader of Bryology at the National Botanical Research Institute, Lucknow. He is a member of several National and International Academic Societies. He has recently been nominated as member of the National Academy of Sciences, India.

Dr. Syeda Azeem Unnisa is currently a lecturer at Jawaharlal Nehru Technological University, Hyderabad, India. She is a young scientist awardee. She has published 30 research papers.

Mr. S.K. Mathur is the former Director, Horticulture, Rashtrapati Bhavan Gardens, New Delhi. At present he is a leading landscapist based in New Delhi.

Dr. Brajesh K. Dwivedi is a lecturer in Environmental Sciences at Allahabad University, India. His area of researches are: potable water, waste water monitoring (Bio-toxin Status and their Influx) and their bio-forced remediation.

Dr. Rajesh Kumar Jain, Ph.D. in Botany is Principal, S.R.I.M.T., Debai, Uttar Pradesh.

Er. Tilak Basu, B.E. Chemical Engineering is a senior scientist at Central Glass & Ceramic Research Institute, Kolkata

Mr. Raju Chaurasia, M.Sc. (Ag.) Horticulture is Superintendent Gardens, Lucknow Nagar Nigam, Lucknow.

Dr. Ajay Kumar Trivedi is a Senior Scientist at the Regional Station (NBPGR), Bhowali, Nainital, India

Dr. Pankaj Sharma (Ph.D. in Genetics) is a Scientist, residing at 1/119, Vivek Khand – I, Gomti Nagar, Lucknow.

Dr. Ms. Shyamli Singh is a Lecturer at Bhagwan Parshuram Institute of Technology, Delhi.

Dr. Sanjay Dwivedi is a Scientist (DST) in the Ecotoxicology & Bioremediation Group of NBRI, Lucknow (India). Dr. Dwivedi has actively participated in all the International Conferences on Plants and Environmental Pollution organized by ISEB.

Mr. Sanjay Bhargava is a horticulturist and nature lover.

Mr. Ravi Kapoor is a well know naturalist having deep interest in photography.

Dr. Rama Kant is Assistant Professor & Head, Department of Botany, Ram Krishna Mahavidyalaya Kailashahar, North Tripura.

NEWS FLASH

Dr. K.C. Gupta, a distinguished Environmental Toxicologist of the country and the Director, Indian Institute of Toxicology Research, Lucknow has taken over additional charge as Director, National Botanical Research Institute, Lucknow from Dr. Rakesh Tuli, who has been appointed as Founder Executive Director of the National Agri-Food Biotechnology Institute (Department of Biotechnology, Government of India) at Mohali, Panjab. The Executive Committee of ISEB at a meeting held on 2 March, 2010 elected Dr. K.C. Gupta as the new President of ISEB. Dr. Rakesh Tuli will continue to be associated with ISEB as an Advisor.

Prof. M.N.V. Prasad, an internationally renowned environmental scientist of the country and professor of plant sciences at the university of Hyderabad have been awarded the prestigious Pitamber Pant National Environmental Fellowship by the Ministry of Environment and Forests, Govt. of India. Under this fellowship, Prof. Prasad will work on a research project entitled "Phyto-products from plants applied in Phytoremediation of heavy metal and contaminated soils.

Dr. C.S. Nautiyal, a senior scientist of the National Botanical Research institute, Lucknow and, a Life Member of International Society of Environmental Botanists, has been awarded the prestigious TATA Innovation Fellowship by the Department of Biotechnology, Govt of India. This award has been given to him in recognition of his outstanding research in finding solutions through innovative scientific knowledge. Dr. Nautiyal has been working on plantmicrobe interaction for enhancing plant yields.

Environmental Awareness Programme

On the invitation of Lucknow Municipal Corporation, Dr. S.C. Sharma, Vice-President of ISEB coordinated an Environmental Awareness and Educational Programme in the Flower Show organized in Lucknow on February 25-26, 2010. ISEB presented a model with living plant species for tree plantation on the road sides and dividers for improving the ecology of the metro cities. Ms. Kanti Srivastava, Convener, Environmental Awareness Programme, ISEB and her team members, Ms. Nupur and Shivani Srivastava actively participated in the programme. Former Mayor Padmashri Dr. S.C. Rai and present Mayor Prof. Dinesh Sharma visited the stall and showed keen interest in the ISEB activities. They proposed to adopt the said model for the Lucknow city to make it clean and

green. The stall put up by ISEB was adjudged the best stall of the Flower Show and awarded a Shield and Certificate as a token of appreciation.

Dr. Sharma's Visit to Shenzhen, China

On the invitation from Prof. Yong Li, Director Fairy Lake Botanical Garden, Shenzhen, P.R. China, Dr. S.C. Sharma, Vice-President I.S.E.B. visited the world famous Botanical Garden from December 16-25, 2009. The Botanical Garden is in an area of 600 hectares with rich collection of 7000 plant species and cultivars. Plant collections are aesthetically displayed with educational tableau in the open as well as in the Plant Houses. The Garden is surrounded by low mountains and lakes which help in lowering the temperature and healthy growth of plants. The garden has a rich collection of indigenous as well as exotic Cycads. Some Cycads are 1500 years old. Cycad Garden has been recognized as a research centre by IUCN. Dr. Sharma had very fruitful discussion with Prof. Nan Li, Vice-Chairman and Secretary General of the Cycad Society of China. The Butterfly Garden and Bonsai House are great attractions to the visitors. There is a beautiful lake covering an area of 50 hectares, befitting to the name Fairy Lake Botanical Garden. Dr. Sharma delivered lectures on "Horto-taxonomical Studies on *Bougainvillea*" and "NBRI Botanical Garden-A National Facility" in the International Auditorium of the Institute.

Dr. Sharma had very close interaction with Prof. Chen Tao on the Urban Ecology with special reference to the usage of Bougainvilleas. It is interesting to learn that the city flower of the Shenzhen is *Bougainvillea*.

On way back to India, Dr. Sharma visited Macao and Hong Kong islands to study the city landscaping. These islands are very beautiful, green and punctuated with environmental pollution tolerant plant species.

OUTGOING PRESIDENT'S MESSAGE

International Society of Environmental Botanists (ISEB) was founded almost a year after I joined NBRI in September, 1992. Initially, I did not take much notice of this Society, perhaps because I was too engrossed in organizing my research group in plant molecular biology. However, within a short time ISEB made its presence felt through a series of outreach programmes and the ICPEP-1 international conference. I was impressed by its societal contributions and thus enrolled myself as its Life Member. Since then in 1996, my bonds with ISEB have been growing stronger day by day culminating, into my taking over as its President in February 2006.

One of the most noteworthy contributions of ISEB is its timely publication of quarterly newsletter, ***Environews*** since January 1995. It now has a worldwide circulation. Highly distinguished environmental/plant scientists from not only India but also other countries have been contributing articles to ***Environews*** which bears testimony to the global reach and popularity of this modest newsmagazine.

I was particularly impressed by many student centric educational and outreach programmes organized by ISEB from time to time. These included: popular lectures by distinguished scientists, debates, film shows, art and painting competitions, radio and TV talks which greatly helped in inculcating interest and awareness among students about various environmental issues. Primary school children and women folks in rural areas around Lucknow were also targeted through a series of programmes on environment, health, sanitation and conservation of biodiversity. Local student volunteers enthusiastically joined the teams of ISEB and NBRI scientists in conducting these programmes in community centres and primary schools in these rural areas. The society has been doing commendable work in sensitising youngsters to the growing issues for sustainable management of environment.

First International Conference on Plants & Environmental Pollution (ICPEP-1) organized by ISEB in collaboration with NBRI in November 1996 was a landmark in the history of ISEB and NBRI. This laid the foundation of a symbiotic relationship between the two organisations. ICPEP-1 was followed by ICPEP-2 in 2002 and ICPEP-3 in 2005. These three largely attended conferences attracted highly distinguished environmental scientists, researchers and students from all parts of the world. International organizations like UNESCO, UNEP, TWAS, COSTED, NAM S&T Centre and Indo-US Science & Technology Forum and several Indian organizations and government departments/ministries sponsored these conferences. These highly successful conferences enabled ISEB to grow in stature, and to win international acclaim and recognition. Paris based International Union of Biological Sciences (IUBS) granted its scientific membership to ISEB which is a unique honour for any scientific organization/society.

During my tenure as President, ISEB maintained its fast pace of growth and all round development. There was a phenomenal growth in membership. I took personal interest in ensuring up gradation and modernisation of the ISEB office by providing necessary logistic and staff support. On the request of the ISEB Executive, I accepted the proposal for organizing ICPEP-4 in December 2010. The preparations for organizing this Conference on a grand scale are underway and I am sure our highly experienced and talented team along with Members and appreciators globally will make all out efforts to make it a landmark in the history of ISEB.

I am now leaving National Botanical Research Institute – a beautiful institute with a rich history of contributions to plant sciences and biodiversity, to take up a new assignment of developing an institute – National Agri-Food Biotechnology Institute (NABI) at Mohali in the state of Punjab. My future contact address is given below. As I bid goodbye to my official responsibilities at NBRI, I also lay down the office of President ISEB. I deeply cherish sweet memories of working with the Executive and officials of ISEB, whose trust, confidence and unstinted support I enjoyed during my 4 years tenure. Though I am going to Mohali with a formidable and challenging task of organizing a new institute, my fond memories of ISEB will keep me attached to all of you. I will continue to learn about and support the future activities of ISEB. My commitment for ICPEP-4 remains firm and I would like to keep myself abreast with the preparations. The Organizing Committee can certainly count on my support in coming days. I assure you that my bonds with the ISEB community will not weaken due to my shifting from Lucknow.

The membership of ISEB has grown from 28 at the time of its founding to over 350 today. The membership extends to all parts of India and several countries like U.K., U.S.A., Canada, Spain, Bangladesh, Nepal, Sri Lanka etc. The 16 years young ISEB is poised to play an important role.

I extend my best wishes to ISEB for its continued success and for winning many more laurels in the future. I wish an equally enriching experience to the new President of ISEB.

(Dr. Rakesh Tuli)
Executive Director
National Agri-Food Biotechnology Institute, C-127, Industrial Area, S.A.S Nagar, Phase 8
Mohali – 160071, Punjab., (Former Director NBRI & President ISEB)

Dr. Mridul Kumar Shukla, STA, Ecotoxicology and Bioremediation Group, of National Botanical Research Institute, Lucknow has been awarded 'Bhojpuri-Vigyan Gaurav award' sponsored by the All India Bhojpuri Society, India for his outstanding contributions in organizing of science awareness conferences at remote and rural area of Uttar Pradesh for marginalized people.

Dr. S.C. Sharma Vice president ISEB has been nominated as a member of the Biodiversity Board as well as Biodiversity Park by Uttar Pradesh Government, Lucknow.

Dr. P. Pushpangadan former president ISEB & Director NBRI has been awarded with the National award **Padma Shri** by the president of India. Dr. Pushpangadan is currently Director General of Amity Institute of Herbal and Biotech Products Development, Trivandrum, Kerala (India).

ECO-DEVELOPMENT AS A TOOL FOR THE CONTROL OF CLIMATE CHANGE HAZARDS OF KUTTANAD WETLANDS OF KERALA

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The wetland ecosystem all over the world is fundamentally characterized by water stress as a focus of environmental impacts on biodiversity and human habitats. In Kerala scenario, with 44 rivers and distinctive physio-geographical features, the wetland system offers an opportunity to carry out intensive research and to address sustainable development issues, in which a model area identified is the Kuttanad wetlands. The location is characterized by a coast line with the Arabian Sea in the west, a stretch of backwaters in the east, associated by extensive rice fields and a net work of canals connected to major rivers draining into the area. In fact, the backwaters itself form a reservoir of pollutants sourced in the sewage from cities and towns, and organic sediments from the rivers.

The phenomenon of climate change is related to the increasing level of CO_2 in the air as a bye product of various gas emissions, like SO_2, NO_x and even Methane from rice fields, apart from CO_2 emission from fuel wood. The area is also marked by natural background radiation from the thorium rich coastline, and spilled over the entire wetland system, the impact of which on the green house effect is yet to be properly assessed and quantified. Further, the Kuttanad area is below sea level and therefore vulnerable to sea water intrusion due to rising level of the sea which is perceived to occur as a result of climate change. Any increase in carbon load of the air will eventually lead to an increase in atmospheric temperature (may be about 1^0C more in the next 50 years or even less) if the hazard is not adequately controlled.

A documentation of the flora in the Kuttanad wetlands in Alappuzha district covering an area of 1414 sq. kms. has indicated the paucity of vegetational elements, with just 338 Species, of which the tree wealth is very poor being restricted to 89 species. The vegetation and its composition, particularly the tree wealth, could be very crucial for arresting the impacts of climate change. The leaf system and its spread can effectively control the photosynthetic activity in which CO_2 is captured and O_2 is released. It is therefore imperative that the vegetational composition of Kuttanad wetlands need to be fortified through green belt development with appropriate plant species, particularly the trees, in conformity with the existing ecological pattern, with the addition of new elements of benefit to livelihood, socio-economic gains, conservation and ecorestoration. In such a process it will be important to generate new knowledge on epidermal features especially the stomatal index and its efficiency in the process of gas exchange, associated with photosynthesis.

A thematic ecodevelopment of coastal belt and associated wetlands could have multidirectional impacts in controlling marine related hazards like the tsunami at the same time as the improvement of human health resulting from higher oxygen output. As a beginning to the demonstration of the benefits of green belting, studies have been carried out in the tsunami affected panchayats of Arattupuzha and wetland panchayat of Kainakari, in which the cashew plant has been identified as one of the tree elements and *Calophyllum inophyllum* has been notified as an example of ecorestoration of the lost biodiversity. Together with the above, naturally occurring coconut palm, which withstood the tsunami, will be retained with the addition of dwarf coconut, in the programme of evolving an agroforestry system. Thus, ecodevelopment is an inevitable option for the control of wetland stress with benefits in ecology, economy and environment.

CLIMATE CHANGE , TOWARDS A BOOMING BANE

Richa Dave, Rudra Deo Tripathi, Sanjay Dwivedi & S. N. Singh
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Climate change is considered as the greatest civilization threat today to human beings and life on earth. Carbon dioxide, methane, and nitrous oxide have increased markedly as a result of human activities since 1750 and now far exceed pre-industrial values. Methane (CH_4), from rice paddy production and enteric fermentation, is increasing, as are chlorofluorocarbons (CFCs) that have been used for many years as a refrigerant and to produce foam. Methane is a much more potent greenhouse gas (GHG) than CO_2. Carbon dioxide, methane, nitrous oxide and three groups of fluorinated gases (sulfur hexafluoride, HFCs, and PFCs) are the major greenhouse gases.

The amount of carbon dioxide in the atmosphere today (387 ppm) exceeds by far the natural range of the last 650,000 years (180 to 300 ppm). The current amount of methane in the atmosphere (1745 ppb) exceeds by far the natural range of the last 650,000 years (320 to 790 ppb). The primary source of the increase in carbon dioxide is fossil fuel use, but land-use changes also make a contribution. The primary source of the increase in methane is very likely to be a combination of human agricultural activities and fossil fuel use. Nitrous oxide concentrations have risen from a pre-industrial value of 270 ppb to 314 ppb more than a third of this rise is due to human activity, primarily agriculture. Perfluorocarbons (PFCs) and sulphur hexafluoride (SF6) are greenhouse gases with atmospheric lifetimes of more than 1000 years. They are powerful greenhouse gases and today's emissions will still be affecting earth's climate in the next millennium. Man's use of fluorides has given rise to significant emissions of both PFCs and SF6 in recent years.

These gases contribute to the greenhouse effect that is warming our atmosphere day by day. The greenhouse effect results from the trapping of solar radiation that radiates back from the Earth's surface by these gases. The atmosphere is essentially transparent to incoming short wave solar radiation. After striking the Earth's surface, the wavelength of this radiation increases as it loses energy. The GHG's are opaque to this lower energy radiation, and therefore trap it as heat, thereby increasing the atmospheric temperature. As these gases increase, due to natural causes and human activities, they enhance the greenhouse effect, and may raise temperatures even more. If the **climate warms**, the vegetation belts will tend to move northward, changing global ecological and biome patterns. Other effects may be discerned in precipitation patterns, sea level changes, and more. This leads to a complex chain of events affecting the global climate or which can be summarized as **CLIMATE CHANGE,** which is a long-term shift or alteration in the climate due to anthropogenic activities.

One obvious consequence of the significant rise in CO_2 in the northern polar latitudes would be melting of Arctic Ocean and Greenland Ice Cap ices, releasing huge quantities of stored water that would have an extremely serious impact on global sea levels.

Calculations show that the burning of fossil fuels (mainly coal, petroleum derivatives, and natural gas) adds about 6 billion metric tons of carbon (as the element) to the air annually; each year also, deforestation permits an extra 1-2 billion metric tons of carbon to reach the atmosphere. The projected climate is both wetter and warmer. There is considerable geographical variation in the magnitude of changes for both temperature as well as rainfall. North-Western India is likely to become drier, while north-eastern India is likely to become much wetter. The temperature increases in north-western India is also much more than that in the northeast. Southern and south-eastern parts of India are likely to experience only a moderate increase in temperature.

Warmer global temperatures are already causing profound changes in many of the earth's natural systems. Approximately 20-30 per cent of plant and animal species assessed so far are likely to be at increased risk of extinction if increases in global average temperature exceed 1.5-2.5°C.

In all regions of the world, with faster temperature rise, the greater is the risk of damage. The climate does not respond immediately to emissions, which can last for years or decades in the atmosphere. And because of the delaying effect of the oceans - which absorb and eventually release heat more slowly than the atmosphere - surface

Gas	Preindustrial level	Current level	Increase since 1750	Radiative forcing (W/m^2)
Carbon dioxide	280 ppm	387ppm	107 ppm	1.46
Methane	700 ppb	1745 ppb	1045 ppb	0.48
Nitrous oxide	270 ppb	314 ppb	44 ppb	0.15
CFC-12	0	533 ppt	533 ppt	0.17

temperatures do not immediately respond to greenhouse gas emissions. As a result, climate change will continue for hundreds of years even after atmospheric concentrations are stabilized.

Rising temperatures are already accelerating the hydrological cycle. A warmer atmosphere holds more moisture, becomes less stable and produces more precipitation, particularly in the form of heavy rain bursts. Greater heat also speeds up evaporation. The net effect of these changes in the cycling of water will be a decline in the quantity and quality of freshwater supplies in all the major regions. Meanwhile, wind patterns and storm tracks are also likely to change. The intensity (but not the frequency) of tropical cyclones is expected to increase, with larger peak wind speeds and heavier rains.

Climate change will increasingly alter the distribution of malarial vectors and other carriers of infectious diseases, affect the seasonal distribution of some allergy-causing pollen and increase the risks of heat waves. On the other hand, there may be casualties due to the extreme cold in some parts of the world.

The best estimate for how much further the sea level will rise due to ocean expansion and glacier melt by the end of the 21st century (compared to 1989-1999 levels) is 28-58 cm. This will worsen coastal flooding and erosion. Larger sea-level increases of up to 1 metre by 2100 cannot be ruled out, if ice sheets continue to melt as temperature rises. There is now an evidence that the Antarctic and Greenland ice sheets are indeed slowly losing mass and contributing to sea level rise. About 125,000 years ago, when the polar regions were significantly warmer for an extended period than at present, melting polar ice caused the sea level to rise by 4 to 6 metres. Sea-level rise has substantial inertia and will continue for many centuries. The oceans will also experience higher temperatures, which have implications on sea life. Over the past four decades, for example, North Atlantic planktons have migrated poleward by 10 degrees of latitude. Similarly, the acidification of the oceans, as they absorb more carbon dioxide, will impair the ability of corals, marine snails and other species to form their shells or skeletons.

The poorest communities will be the most vulnerable to the impacts of climate change as they have fewer resources to invest in preventing and mitigating the effects of climate change. Some of the most at-risks of people include subsistence farmers, indigenous people and coastal populations.

Climate change and Agriculture

It seems obvious that any significant change in climate on a global scale should impact local agriculture, and therefore affect the world's food supply. Climate change presents crop production with prospects for both benefits and drawbacks. Crop species vary in their response to CO_2. Thus, under CO_2 enrichment, crops may use less water even while they produce more carbohydrates. At the same time, associated climatic effects, such as higher temperatures, changes in rainfall and soil moisture, and increased frequencies of extreme meteorological events, could either enhance or negate potentially beneficial effects of enhanced atmospheric CO_2 on crop physiology.

In middle and higher latitudes, global warming will extend the length of the potential growing season, allowing earlier planting of crops in the spring, earlier maturation and harvesting, and the possibility of completing two or more cropping cycles during the same season. Crop-producing areas may expand poleward in countries such as Canada and Russia, although yields in higher latitudes will likely be lower due to the less fertile soils that lie there. Many crops have become adapted to the growing-season daylengths of the middle and lower latitudes and may not respond well to the much longer days of the high latitude summers. In warmer lower latitude regions, increased temperatures may accelerate the rate at which plants release CO_2 in the process of *respiration*, resulting in less than optimal conditions for the net growth. When temperatures exceed the optimal for biological processes, crops often respond negatively with a steep drop in net growth and yield. If night time temperature minima rise more than the daytime maxima - as is expected from greenhouse warming projections - heat stress during the day may be less severe than otherwise, but increased night time respiration may also reduce potential yields. Such reduced yield has already been experienced in paddy crop. Another important effect of high temperature is accelerated physiological development, resulting in hastened maturation and reduced yield.

Moderate climate change effect on world food production may be small, as reduced production in some areas is balanced by gains in others. The same studies however, find that vulnerability to climate change is systematically greater in developing countries--which in most cases are located in lower warmer latitudes. In those regions, cereal grain yields are projected to decline under climate change scenarios, across the full range of expected warming. Agricultural exporters in middle and high latitudes (such as the U.S., Canada, and Australia) stand to gain, as their national production is predicted to expand, and particularly, if grain supplies are restricted and prices rise. Thus, countries with the lowest income may be the hardest hit.

Climate change can impact agricultural sustainability in two interrelated ways: first, by diminishing the long-term ability of agroecosystems to provide food and fiber for the world's population; and second, by inducing shifts in agricultural regions that may encroach upon natural habitats, at the expense of floral and faunal diversity. Global warming may encourage the expansion of agricultural activities into regions now occupied by natural

ecosystems such as forests, particularly at mid- and high-latitudes. Forced encroachments of this sort may thwart the processes of natural selection of climatically-adapted native crops and other species.

How does global warming affect India?

The major challenges for India in terms of global warming lie in rising sea levels, melting glaciers and agricultural impacts. Global warming is causing the Gangotri glacier to recede at an annual rate of 30 metres, and the Pindari glacier is retreating at a rate of 13 metres per year. In recent years, extreme weather events like floods, droughts and catastrophes like the Mumbai floods have increased and are probable to rise drastically in the coming decades. Central and Northern India is projected to get less rainfall because of global warming and climate change. In West Bengal, Sunderban mangrove swamps may be affected because of sea level rise. With rising sea levels, salt marshes and mudflats in the Rann of Kutch, the habitat of the greater Flamingoes in Asia may be submerged. About 2000 Indian wild asses could lose their only habitat in India.

High yield states like Punjab, Haryana and Uttar Pradesh will suffer a decrease of 10%in wheat yield, if winter temperature increases by 0.5°C. The data of onset of summer monsoon over Central India may become more variable. Due to increase in temperature the South Western parts of India may receive more rainfall.

About one metre rise in sea level may displace approximately 7.1 million people in India. Because of sea level rise, the entire population of Lakshadweep is at risk. Wet areas could become wetter and dry areas could become drier.

Degradation of soil and water resources is one of the main challenges for global agriculture. Climate change will further alter agriculture systems with dangerous consequences for food production and the risk of reduced food yields is greatest in developing countries, where at present 790 million people are estimated to be undernourished. **India is expected to lose 125 million tones (about 18%) of its rain fed cereal production potential.** If agriculture production goes down, the price of staple food commodities will increase. According to a World Bank study, a 2°C rise in temperature along with a 7% increase in rainfall will reduce net agriculture revenues by 12.3% for the whole country. Agriculture in the coastal regions of Gujarat, Maharashtra and Karnataka will be severely affected. An increase in minimum temperature from 18°C to 19°C will result in a decrease in rice yield of 0.71 tonne per hectare, while an increase from 22°C to 23°C will result in a decrease of 0.41 tonne per hectare.

According to scientists, some positive effects of climate change may also be expected because of increase in CO_2 in the atmosphere, which may have fertilizing effect on crop growth and yields.

Ecosystems that cannot move northwards at a rate dictated by global warming will be most at risk. These include, glacial ecosystems, coral reefs, atolls, forests and Himalayan systems. Indian winters may experience a decline of 5-25% in rainfall. More intense rainfall spells are expected in a warmer atmosphere. If rainfall decreases, water flow of rain fed rivers will decrease affecting ground water recharge. Increase in rainfall might aggravate flood situations, bringing destruction and disease.

A rise in sea surface temperature may be accompanied by an increase in tropical cyclone intensities. The intensity may increase by 10-20% with a rise of 2°C - 4°C in sea surface temperature. This will lead to storm surges along the eastern coast of India.

The Himalayan glaciers have been shrinking at an accelerated rate. An intensified monsoon and high temperatures may lead to retreating and thinning of glaciers, increasing the risks of flash floods.

With the right policies, the rise in the level of greenhouse gases in the atmosphere can be slowed and ultimately stabilized. If global CO_2 emissions peak by 2015 and fall to 50-85 per cent of 2000 levels by 2050, global mean temperature increases could be limited to 2-2.4°C above pre-industrial levels. Cleaner technologies and energy efficiency can provide solutions, allowing economic growth and the fight against climate change to proceed hand in hand. Arresting today's high levels of deforestation and creating new forests could considerably reduce greenhouse gas emissions at low costs. About 65 per cent of the total mitigation potential for forests lies in the tropics and 50 per cent can be achieved by simply avoiding deforestation. In the longer term, the best way to maintain or increase the ability of forests to sequester carbon dioxide is through sustainable forest management, which also has many social and environmental benefits.

Resources and initiatives that promote low carbon economies and life styles, such as improved energy efficiency, alternative energy sources, forest conservation and eco-friendly consumption, form the crux of sustainable development for a clean and healthy future. But the most important tool for such initiatives is sensitization of the global population towards environmental problems and mitigation. This is where the need for the youth to step in arrives. The past generation has been oblivious to the climate change problem, the present generation is in denial, and therefore, the coming generation holds the baton in the race against climate change. The responsibility of a developing country like ours doubles up, as we are one of the worst

sufferers of climate change and our contribution to greenhouse build up can still be controlled effectively. The solution is more pertinent at grassroots level, which is where sensitization, awareness and instilling leadership qualities in our coming generations takes forefront. The coming generation needs to be aware of the looming danger of climate change as well as participate in green solutions more of as a habit rather than a compulsion.

The 2009 United Nations Climate Change Conference, commonly known as the Copenhagen Summit, was held at the Bella Center in Copenhagen, Denmark, between 7 December and 18 December. The Copenhagen declaration recognised that climate change is one of the greatest challenges of the present day and that actions should be taken to keep any temperature increases to below 2°C.

Humans have been adapting to changing climatic conditions for centuries. However, the climate change that the world is presently experiencing is occurring far more rapidly than anything the Earth has experienced in the last 10,000 years.

Climate change is expected to exacerbate current stresses on water resources from population growth and economic and land-use change, including urbanisation. On a regional scale, mountain snow pack, glaciers and small ice caps play a crucial role in freshwater availability. Widespread mass losses from glaciers and reductions in snow cover over recent decades are projected to accelerate throughout the 21st century, reducing water availability, hydropower potential, and changing seasonality of flows in regions supplied by meltwater from major mountain ranges (e.g. Hindu-Kush, Himalaya, Andes), where more than one-sixth of the world population currently lives. With the rising temperatures, increasing populations coupled with booming economies at the cost of environment is leading us to the bane of irreversible climate change. The future does not hold a good promise for the coming generations unless the present generation can take up adequate steps to mitigate the menace by global efforts. The nations, developed or developing have to forego their conflicting interests for the noble cause for saving the humanity from extinction.

CULTIVATION OF TOMATO PLANTS (*LYCOPERSICON ESCULENTUM*) USING MUNICIPAL SOLID WASTE COMPOST

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Tomato *(Lycopersicon esculentum)* is considered as one of the most essential vegetable crops for human nutrition. The deficiency of plant nutrients causes different changes in the physiological and biochemical processes within the plant cell resulting in a reduction of growth, delay of development and qualitative and quantitative decrease of yield, Heavy metal contamination of soils has markedly increased in the past few decades. Many factors such as metal-enriched parent materials, mining or industrial activities, non-point sources of metals, especially automotive emission, and use of metal-enriched materials, including chemical fertilizer, farm manures, sewage sludge, and wastewater irrigation, can contribute to this contamination. Waste is a material that is not needed and it's economically unstable without further processing, and it may be in the form of liquid, solid or gas. Waste added to soils increases the percentage organic matter, the concentration of macro- and micro-nutrients and the activities of micro organism[7]. Town waste has a high manurial value and it improves the growth of crops. The addition of urban waste to soil improves the fertility by acting directly on its biological, physical and chemical properties which in turn activate the microbial biomass, improves soil structure, increase water holding capacity and aggregate stability.

Composting of municipal solid waste (MSW) and its subsequent application to agricultural land is gaining popularity because of environmental concerns associated with the disposal of this material in landfills. Several studies have shown that use of MSW compost in agriculture has many benefits to soil, crops and environment. However, Heavy metal pollution of agricultural soils and crops through the applications of MSW (Municipal Solid Waste) compost and sewage sludge are of great concern. Although MSW compost provides nutrients for plant growth, its continual use over extended periods can result in the accumulation of heavy metals in soils and in the crops to levels that are detrimental to the food chain. As a matter of fact, pollution problems may arise if toxic metals are mobilized into the soil solution and are either taken up by plants or transported in drainage waters. Risk for human health may then occur through consumption of such crops and intake of contaminated waters. In the long term, the use of MSW compost can also cause a significant accumulation of trace metals in the soil and plants. Thus, modifications of biological properties caused by compost amendments may have an indirect effect on physico-chemical conditions. Therefore, benefits of compost in relation to soil restoration are substantial. Due to these positive effects, compost is applied not only for the improvement of agricultural soils, but for the recovery of disturbed soils as a consequence of pollution or fires or soils given to suffer erosion. Nevertheless, since some aspects of the way in which this positive influence is produced remain unclear, a better

understanding of the process, mainly from a biological point of view, is needed. Composting uses very little external energy and in urban areas, especially in the rapid urbanizing cities of the developing world, problems and issues of Municipal Solid Waste Management are of immediate importance. Land filling disposal of wastes contributes flooding, breeding of insect and rodent vectors, the spread of diseases and polluting ground water quality. Composting is the simplest yet best process for solid waste management. Information on the heavy metal loading potentials of MSW compost and its effects on the plants are scarce.

A pot experiment was carried out in the greenhouse and tomato plants grown in soil treated with MSW compost. The MSW compost was obtained from the Solid waste composting plant, Bangalore. Compost was made from sugarcane bagasse, Municipal solid waste and cattle manure in the proportions 75-0-25, 75-05-20, 75-10-15, 75-15-10 or 75-20-05 75-25-0 (i.e., composts with 0, 5,10,15,20 and 25% MSW) were air-dried, mixed and sieved through a 2- mm-mesh sieve before filling to pots. Pots were arranged in triplicate. Before transplanting the plants, all treatments received supplemental fertilization at a rate of 50, 75, 100, 110 and 120 mg kg^{-1} of N, P and K, respectively. Pots were maintained around field capacity by daily watering with distilled water. Leaf samples were taken at flowering period.Tomato fruits reached maturation after 165 days of transplanting. Total fruit yield per pot was recorded till the end of harvest. Samples of root, stem, leaf and fruit samples of tomato plant were subjected to digestion with HNO_3, H_2O_2, and HCl and the metal concentration was determined by AAS.

The heavy metal contents of untreated soil are well within the accepted normal range of values. A comparison of metal contents of MSW compost with that of untreated soil showed that the metals Cr, Cu, Ni, Pb and Cd were present in MSW compost in greater concentrations than in the soil. Compared with metal limits at the highest application of MSW compost (192g/pot), Zn, Cu, Ni and Pb contents of tomato plant were found in high levels. Nevertheless, all metal concentrations were below the phytotoxic maximum limits. The concentration of Cd in the fruit tissues and leaves of tomato plant grown in control treatment was small and below the detection limit of analytical apparatus. Although concentration of total Zn, Cu, Ni and Pb in the highest MSW compost treatments was particularly large and near to toxic level, there was no evidence that plant growth was affected detrimentally. Roots and stem of tomato plant contained higher metal concentrations than that of leaf and fruit tissues. This is important because of edible fraction of plant.

The tomato crop responds very well to manurial and fertilizer application. The exact requirement of manurial and fertilizers would depend on the fertility status of the soil in which the crop is being taken. The study revealed that the use of Municipal solid waste up to 25% during tomato harvest maintains the heavy metal concentration under permissible limits. The research is being continued further for upper limit of MSW rates.

NEWS AND VIEWS

HAZARDS OF LEAD TOXICITY TO SCHOOL KIDS

Experts from Quality Council of India have found that over 51.5 per cent children below 12 years in Indian metros have their blood-levels above in the permissible limit of 10 microgram per decilitre - a concentration dangerous enough to reduced IQs by four to six units and cause serious development disorders. The health hazard has been traced to high lead levels in domestic paints, used in walls in schools and residences, school buses, swings in play grounds and toys. Sudden decline in IQ levels of children and unexplained retardation or hyperactivity among them are the major symptoms of lead poisoning. Over 93 per cent paints manufactured in India contain added lead. Unfortunately, symptoms of lead poisoning do not reveal themselves easily. A parent, whose child suddenly loses IQ will hardly know that the paints on the child's school bus is causing the damage.

Source: *The Tribune, New Delhi*

WETLANDS INTERNATIONAL PROMOTES THE ROLE OF MANGROVES IN FIGHTING CLIMATE CHANGE

Coastal communities are very vulnerable impacts from climate change. Many agricultural areas in West Africa may be lost due to sea level rise and salt water intrusion. Mangrove forests have the ability to reduce these climate impacts, protecting inland areas, as the trees are buffer against waves, help to accumulate silt and create a barrier against salt water. In Africa, as well as in other continents, many mangrove forests have been lost in the past years due to wood harvesting and reclamation for agricultural purposes. Loss of mangrove forests has had a big impact on the survival of water birds, on fish stocks that depend on mangrove forests and on the availability of wood for building and as a fuel.

World renowned NGO ***Wetlands International*** has launched a new mangrove project with the help of government in Guinea Bissau, which will demonstrate how better management of mangrove forests can help in

reducing coastal climate change impacts. The project aims to deliver the knowledge for the development of national policies in the fight against climate change impact.

Source: *Alex Kaat, Wetland International*
www.wetlands.org

PLANTS FOR AIR PURIFICATION

It is a widely held misconception that staying indoors avoids exposure to air pollutants. Indoor air quality, in fact, is usually worse because contaminants that emanate from a vast assortment of consumer products add to the publication that drifts in from the outside. Given that urban dwellers pass 90% of their time inside, any strategy to improve indoor air qualities of wide spread interest, especially one as appealing and environmentally sustainable as adding potted plants to the decor.

The chief forms of pollutants generated indoors are known as volatile organic compounds (VOCs) that off –gas primarily from common petroleum-based products. They are impossible to avoid since the sources are nearly endless: furniture, carpeting, paints, varnishes, paint strippers, synthetic building materials, air fresheners, cleaning solutions, toilet bowl deodorizers, personal care products, tobacco smoke, pesticides, and solvents in inks and adhesives.

The number of VOCs in indoor air is more than 900. While some pose no known danger to health, others are linked to acute and chronic health effects like asthma, impaired lung function, or damage to liver and kidneys. Mixtures of VOCs are generally thought to be cause of Sick Building Syndrome in which sensitive individuals experi-ence symptoms of headache, nausea, and/or eye, nose and throat irritation in specific indoor settings. Some VOCs are even known to be carcinogenic, like benzene in tobacco smoke, perchlo-roethylene in dry-cleaning fluid, methy-lene chloride in paint strippers, and formaldehyde in pressed wood product like particle board.

The mainstream approach to lowering VOCs has been to install commercial air filtering devices or room ventilation systems that exchange room air for outdoor air. Both run on electricity, so they increase electric bills and ultimately add to overall atmospheric pollution by way of burning fossil fuels to produce that electricity.

Dr. Sarah Mosko, California
sarahmosko.wordpress.com
(Source: *E/The Environmental Magazine)*

GLOBAL WARMING MAKES TREES GROW FASTER

The rising temperature and increase in carbon dioxide emissions may lead to an accelerated growth in trees. The study, which was carried out by the Smithsonian Environmental Research Centre, reports that global warming also contributes to faster tree growth because it extends the duration of seasons favourable to its development, according to Ambiente Brasil.

Scientists collected data from 55 trees in different forests across the eastern United States and compared it with 100 years of climate measurement and 17 years of carbon emissions data. The report concludes that the growth topped the expected values probably due to climate change. It is known that increasing temperatures, the duration of growth and CO_2 emissions influence the physiology of trees. Researchers believe that the increased levels of carbon in the atmosphere help trees facilitate the processes of photosynthesis, while higher temperatures accelerate their metabolisms - though they stressed the need for further research.

Stephen Messenger, Porto Alegre, Brazil

GRASS CYCLING CAN SAVE ENVIRONMENT

Those who love to grow lush green lawn in their homes find it tedious to maintain them. First grass has to be mowed when it is unkempt, collect the disposal in the bag and transport it to landfills to thrust aside. There is an acute shortage of landfills to abandon their waste. Apart from that, dumping of grass clippings in landfills contributes to global warming. It is because of the reason that compact by packed landfills will lack their access to oxygen, sun, air and rain. In this case organic materials like grass clippings decompose an aerobically producing green house gas methane. To save the environment it is advisable to practice eco-friendly technique called grass cycling. Grass cycling is nothing but the innate recycling of grass by leaving grass trimmings on the turn when it is cut down. This process aids in rapid dehydration and decomposition by rendering back helpful nutrients like nitrogen, potassium, phasphorus, organic materials etc. The grass cycling systems is expected to get a hold of free fertilizers thus making the lawn healthier. This grass cycling methodology hoards water requirements by providing moisture and nutrients to the soil and saves time in mowing, bagging and transporting. It also prevents toxic and run-off entering drains thus polluting lakes, rivers, creeks and waste disposed in landfills in protecting environment.

Grass cycling does not cause thatching because grass constitutes 85% of water, also implementing this method reduce the fertilizers needs by 25% and minimum water requirements.

Source: *Fredrick Joy*
Ezine articles.com

CONFERENCES

18th European Biomass Conference & Exhibition
3-7 May 2010; Lyon Convention Centre, Cite Internationale, France
Contact: http://www.conferencebiomass.com/Conference.405.0.html

1st International Conference on Urbanization & Global Environmental Change (UGEC)
15-17 October 2010; Tempe, Arizona U.S.A.
Contact: Corrie Griffith
Project Coordinator, International Project Office
Urbanization and Global Environmental Change (UGEC) - an IHDP Core Project
Arizona State University, PO Box 875402
Tempe, AZ 85287-5402 , U.S.A.
UGEC2010@asu.edu

BOTANY 2010
July 31 – August 4, 2010; Providence, Rhode Island
Contact johanne@botany.org

12th World Congress of the International Association for Plant Biotechnology
June 6011, 2010; St Louis, Missouri, U.S.A.
E-mail: iapb2010@missouri.edu;mccalll@umsystem.edu

2010 International Energy Workshop
June 21-23; Stockholm, Sweden
http://www.internationalenergyworkshop.org/Workshop_2010.html

Urban Environmental Pollution - UEP 2010
Overcoming Obstacles to Sustainability and Quality of Life
June 20-23, 2010; Boston, USA
Website: www.uep2010.com

XVIII International Botanical Congress.
23-30 July 2011; Melbourne, Australia
Contact: Congress Secretariat
ICMS Australasia
GPO Box 5005, Melbourne VIC 3205
Email: info@ibc2011.com

24th International Congress for Conservation Biology (ICCB 2010)
3 to 7 July 2010; Edmonton, Alberta, Canada
Website: http://www.conbio.org/2010
Contact name: Barb Robinson
E-mail: iccb2010@mailman.srv.ualberta.ca.

International Ccnferene on Climate Change & Sustainable Management of Natural Resources
December 5-7 ,2010; Gwalior (M.P.), India.C
Contact: Dr. Raghvendra Saxena
Conference Secretariat
International Conference, IASCA ITM Universe Campus, Opposite Sithouli Railway Station, N.H. 75, Jhansi Road, Gwalior (M.P.), India.
E-mail: iasca@itmuniverse.in
www.itmuniverse.in, www.itmuniverse.org

BOOKS

Environmental Bioremediation Technologies
By : S.N. Singh, R.D. Tripathi
Springer - Verlag Berlin Heidelberg 2007
ISBN : 30-2132-A054321

City out of Chaos: Urban Self Organization and Sustainability
R.M. Pulselli and E. Tiezzi, University of Siena, Italy
ISBN: 978-1-84564-133-7
Price: £58.00

Climate Variability and Extremes during the Past 100 years
Series: Advances in Global Change Research, Vol. 33
Brönnimann, S.; Luterbacher, J.; Ewen, T.; Diaz, H.F.; Stolarski, R.S.; Neu, U. (Eds.).
Springer 2008
ISBN: 978-1-4020-6765-5
Price: 149, 95 €

Environment and Health: Protecting our Common Future
K. Duncan, University of Toronto, Canada
Wit Press 2008
ISBN: 978-1-84564-130-6
Price: £63.00

Biological Monitoring
Theory and Applications
Ed. M.E. Conti, University of Rome 'La Sapienza', Italy
Wit Press 2008
ISBN: 978-1-84564-002-6
Price: £84.00

Environmental Toxicology III
Edited By: C.A. BREBBIA, Wessex Institute of Technology, UK
Wit Press 2010
Price: £133.00
ISBN: 978-1-84564-438-3

Global Climate Change : Beyond Copenhagen
By A.N. Sarkar,
Pentagon Earth An Imprint of Pentagon Press 2010
ISBN : 81-8274-453-0,
Price: $65.00

Emerging Environmental Technologies, Volume II
1st Edition., 2010
Shah, Vishal (Ed.)
Springer
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