ENVIRONEWS

INTERNATIONAL SOCIETY OF ENVIRONMENTAL BOTANISTS

Newsletter

LUCKNOW (INDIA) VOL 14 No 2 APRIL, 2008

IN THIS ISSUE

Journal impact factors - essential primary quality indicators - surely not so!!

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In a recent issue of *Current Science*, Sharma (2007) describes journal impact factor (JIF) as an essential primary quality indicator. This is incorrect because inherent flaws in the determination of the JIFs preclude their use as a quality indicator. JIFs are neither 'essential' nor 'primary' indicators, nor do they reflect any specific 'quality'. The impact factor (IF) is a flawed metric because it does not use a comprehensive database, is centric to a smaller number of journals and the citation of papers is not a foolproof process (Seglen, 1997). The IF and citation of a paper are at best indicators of the 'visibility index' or 'cosmetic' descriptors of research quality and of the papers and journals influenced also by commercial considerations and marketing strategies of the publishers. This is also a modern phenomenon because, not just good science but also 'path breaking' science was published long before the IF metrics were developed.

For the IFs, to have value as motivators and impetus providers (Sharma, 2007), they should not be based on the arbitrarily calculated metrics but more by the relevance of the journal to the context of the work to be published as well as by the most important consideration that the author seeks, namely approbation of his/her work from peers and not a generic audience. Here we will cite three contrasting examples. In the same issue of *Current Science*, Srinivasan and Glover (2007) report on the traditional skill at highly successful mirror making in Kerala using non-sophisticated technology, organic and everyday materials to get a sophisticated, high-technology end-product and that has merited a GI patent. As a second example, Kumar (1999) has shown how the cultivation of betel vine in subtropical India is attributed to what can only be described as the world's earliest (if not the first) example of anthropogenic regulation of plant microclimate. Finally, Zong *et al.* (2007) have shown how more than 7000 years ago the first paddy cultivation in east China was enabled by fire and flood management practices. The first example is of a paper published in *Current Science* (a journal with IF less than 1.0 presently), the second is from a journal that is not listed in *Science Citation Index* (*SCI*) for computation of IF and the third is from *Nature*, a journal with a very high IF. In all these cases, the reports are a retrospective account of technology or science that was practiced much before the concept of scientific

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IMPORTANT

- *While readers of* ***Environews,*** *members of ISEB, conference organizers and publishers of books and periodicals are welcome to submit letters, news and views, news flash for publication in* ***Environews,*** *prior consent is necessary for submission of scientific articles/papers. Unsolicited articles will not be considered for publication due to paucity of space.*
- *Members of ISEB are advised to immediately notify any change in their mailing address and/or e-mail IDs to Secretary ISEB.*

- Informative news, views and popular articles/write-ups on current environmental researches/issues are invited for publication in ENVIRONEWS.
- Environews is published quarterly on the first of January/April/July/October; and is supplied free to all members of ISEB.
- Environews is also supplied in exchange for scientific literature published by reputed organisations.
- All correspondence should be addressed to : **The Secretary, International Society of Environmental Botanists,** National Botanical Research Institute, Lucknow - 226 001 (India).
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LETTERS

Congratulations for the great achievements in popularizing ISEB.

The Article by Prof J.S. Singh, "Environmental Challenges in The Anthropocene" published in ***Environews*** Vol. 14(1), January 2008, is excellent and precise, elucidating the current challenges and the environmental concerns over the globe. The environmentalists and environmental educators have to play a historical role to draw up a strategy for global networking and formulate well-thought and well-debated strategic plans for research, planning, execution and awareness to save our mother earth for a sustained environment and prosperous human society. The environmental concern should get more space in the overall human concerns. The available human and material resources can be networked for more meaningful outcome to assure a sustainable earth's environment. India needs a more precise and focused work plan for the purpose. Another article by Drew, D.A. *et al*. published in the same issue presented a very meaningful plan for urban forest mixture. Many such plans can be drawn by the participation of people at large.

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I am extremely sorry to learn about the sad demise of our two learned colleagues. It is in the fitness of things to send our sincere condolences on behalf of ISEB family to the members of the bereaved families. Both Prof. (Mrs.) Archana Sharma and Prof. N.K. Mehrotra have inspired generations of students through their dedicated service to Indian Botany.

C. K. Varshney
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It is nice to receive mail from India when you are abroad. I have checked your website and it looks nice. I was not aware of your organization before. My sincere wishes to you for running it so efficiently. If you will be interested in having a Canadian chapter for ISEB, please feel free to contact me.

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I would like to pass on the information to you concerning a change in my present position. From June onwards, I will be working as "UN Environmental Officer" in New Delhi.

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United Nations Environmental Officer New Delhi, **India**
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Please note my new postal address:

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Congratulations to all associated with ISEB for the 10,000 milestone tracked by its website. I have recently been promoted as Director in the ministry of Environment & Forests w.e.f. 9th February 2008. It has been a long journey for me wherein I carried out my research activities at the University of Massachusetts, U.S.A., MIT, U.S.A. and Universities of Allahabad, Bradford, Manchester, Liverpool, Glasgow and Edinburgh. Since 1989 I am associated with Ministry of Environment & Forests, Govt. of India, New Delhi.

Dr. P. B. Rastogi
Director, Impact Assessment (Industries)
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Congratulations for the achievement (10,000 hits by ISEB website). I am sure the next 10,000 hits will come within the year.

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I am indeed happy to note the spectacular progress that our Society is making. Your leadership is commendable. Congratulation. Wish you and ISEB all the best.

Prof. B.B. Panda
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Congratulations for the achievement. It is all due to you and your team, which put up enough efforts for the same. I hope ISEB website will be more and more popular in the future.

Dr. V.P. Kapoor
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Congratulations! It's only the hard work of your team that you could achieve this milestone (10.000 hits by ISEB website). Wish you all the best for a very bright future.

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impact was put forth. Ignoring the source where the paper was published and reading it for its contents, it will be obvious that the work reported is profound. If the mirror-making skills were poor science, they would not have survived this long; if betel vine cultivation was serendipitous, it would not be growing so widely in the country as it is currently and if the Chinese paddy cultivation was poor agronomy, we doubt if there would have been any great significance to rice as a crop plant. These three examples strongly support the argument that the context of the paper or of the R&D work involved in the paper as well as the appropriateness of the peer group, who will be interested in a given paper, should at all times be the sole criterion for deciding the publication outlet and not any arbitrarily calculated metric.

The 'golden rule' of Sharma that we should consider only 'like with like', is however, not followed by the journal and citation IFs themselves. By this rule the best journals in all scientific fields should have the same high IF; for example, if the best review journal for immunology, say the *Annual Reviews of Immunology* has an IF of 50, then the best plant science review journal or the best veterinary science review journal must also have the same impact factor of 50. In reality it is not done or is not feasible, and this is the reason why the IFs should not be given any undue importance as 'essential, primary or quality' indicators. It is educative to refer to Seglen's article on why IFs are not a good measure (Seglen, 1997), as well as several arguments for or against the IFs and the several alternative means of calculating similar or related metrics (2008). Finally, Eugene Garfield (1998) (who Sharma has cited heavily from) himself has warned about the 'misuse in evaluating individuals as well as journals' because there is 'a wide variation from article to article even within a single journal'.

Note added in proof: We recently came across an earlier paper (Boero, F., *Trends Ecol. Evolut.*, 2001, **16**, 266) that has categorically shown how over-indulgence with the IF metric has actually harmed the discipline of taxonomy. Since most of the taxonomy journals have very low or no Impact Factors, the taxonomists faced several hardships in performance appraisal as well as securing competitive research grants for their work. This factor has been recognized to be amongst the most important factors for the decline in taxonomy science in the USA.

(Reproduced from 'Current Science')

NEWS FLASH

Prof. C.K. Varshney, former Dean, School of Environmental Sciences, Jawaharlal Nehru University and Vice-President, International Society of Environmental Botanists has been made a member of NRBPT Registration Committee for EIA, Quality Council of India, New Delhi.

He has also been appointed as a member of the Governing Council of Salem Ali Centre of Orinthology and Natural History (SACON), Coimbatore. SACON is an autonomous center of the Ministry of Environment and Forests, Government of India.

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Prof. R.P. Singh, Life Member of International Society of Environmental Botanists (ISEB) & Head, Department of Environmental Science, Baba Saheb Bhimrao Ambedkar University, Lucknow has been recognized as a 'Scientist of Eminence' due to his outstanding contributions in the field of Environmental Awareness among youths, Biotechnology and Research by the Society for Plant Research. The Executive body of Society of Plant Research conferred this award during the inaugural ceremony of National Conference on Biotechnology (Hindi) held at S.V.B.P.U.A. & I, Meerut from March 15-16, 2008.

OBITUARY

ISEB deeply mourns the sad demise of two distinguished botanists of India, **Prof. Mrs. Archana Sharma** and **Prof. N.K. Mehrotra.**

Prof. Archana Sharma, who died on 1 January 2008 in Kolkata, was a former Head of Botany Department, Calcutta University. She was an internationally acclaimed cytogeneticist and cyto-toxicologist.

Prof. N.K. Mehrotra, former Head of Botany Department, Lucknow University was a well known Plant Physiologist and Soil Scientist. He died on 19 January, 2008 in Lucknow after a protracted illness. **Prof. Mehrotra** was one of the founders of ISEB and its Executive Councillor for the past 14 years.

Indian botany has become poorer by passing away of professors **Sharma** and **Mehrotra.**

WELCOME NEW LIFE MEMBERS

Dr. S.N. Pandey is a Lecturer in the Department of Botany, Lucknow University, Lucknow, India.

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Dr. Anil Kumar Dwivedi is a Lecturer in the Department of Botany at Deen Dayal Upadhyay Gorakhpur University. He had obtained his Ph.D. degree in Botany from Banaras Hindu University in 2001. His field of interest is Environmental Assay and he has published over 22 research papers in national and international journals. Dr. Dwivedi has edited two books and has contributed chapters in 3 books.

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Dr. A.K. Shyam is currently associated with GMR group, Banglore as an Environment Specialist. Prior to this he has been working as Head of the Department of Environment, Health and Safety, in Reliance Energy Limited, NOIDA. Earlier he had also worked as Senior Manager. Environmental Engineering Department of the prestigious National Thermal Power Corporation Ltd. NOIDA for over seventeen years.

Dr. Shyam has over 38 year research experience and has made significant contributions in the areas of coal based Power plants, Biofuel & Renewable energy. Currently, he is guiding a Ph.D. Student at the Department of Biosciences, Sri Satya Sai Science Institute of higher learning Prasanthinilayam, Andhra Pradesh.

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Dr. Ms. Prabha Sharma is currently working as a Post Doctoral Fellow with Dr. P.L. Uniyal, at the Department of Botany, University of Delhi. Presently her research work involves investigations on Indian Gymnosperms, the Ephedras. She has carried out extensive explorations in Western Himalayas and Rajasthan for her morphological studies and molecular data generation on Ephedra. Prior to this she had worked under an All India Coordinated project on Taxonomy, funded by Ministry of Environment & Forests, Government of India.

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*Climate Change 2007

Genesis of climate change

The Earth's climate is influenced by many factors, such as, the amount of energy coming from the sun, but also by factors such as the amount of greenhouse gases and aerosols in the atmosphere, and the properties of the Earth's surface, which determine how much of this solar energy is retained or reflected back to space.

The atmospheric concentrations of greenhouse gases such as carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) have significantly increased since the beginning of the industrial revolution. This is mainly due to human activities, such as the burning of fossil fuels, land use change, and agriculture. For instance, the atmospheric concentration of carbon dioxide is now far higher than in the last 650 000 years and has been growing faster in the last ten years than it has been since the beginning of continuous measurements around 1860.

Climate change in the past

The warming of global climate is now unequivocal. There are many observations of increasing air and ocean temperatures, widespread melting of snow and ice, and rising sea levels.

More specifically, eleven of the last twelve years (1995-2006) rank among the 12 warmest years ever recorded since global surface temperatures are measured (1860). Over the last 100 years (1906-2005), global temperature has increased by 0.74°C. Global sea level has risen by 17 cm during the 20th century, because of the melting of snow and ice from many mountains and in the polar regions. More regional changes have also been observed, including changes in Arctic temperatures and ice, ocean salinity, wind patterns, droughts, precipitations, frequency of heat waves and intensity of tropical cyclones. The temperatures of the last half century are unusual in comparison with those of at least the previous 1300 years. The last time that the polar regions remained significantly warmer than now for a very extended period (125 000 years ago), the sea level rose by 4 to 6 meters.

* It is a faithful summary of the IPCC Fourth Assessment Report.; (Environews is grateful to Mr. Jacques de Selliers (<jacques.deselliers@greenfacts.org>), founder & Vice-Chairman, GreenFacts for permitting us to publish it); Source: GreenFacts asbl/vzw, Brussels, Belgium URL: www.greenfacts.org

Future Scenario

The global average temperature is expected to increase by about 0.2°C per decade over the next two decades. Continuing greenhouse gas emissions at or above current rates would cause a further increase in global temperatures and many other climatic changes during the 21st century.

The best estimates for projected global temperature increases from the 1980s to the end of the 21st century range from 1.8°C (1.1 - 2.9°C) to 4°C (2.4 - 6.4°C) for the IPCC scenarios that do not consider additional mitigation measures apart from those already in place in 2000.

Global average sea level is expected to rise by 18 to 59 cm by the end of the 21st century. Warming is expected to be greatest over land and at high northern latitudes and smallest over the Southern Ocean and parts of the North Atlantic Ocean. Other projected changes include acidification of the oceans, reduced snow cover and sea ice, more frequent heat waves and heavy precipitation, more intense tropical cyclones, and slower oceanic currents.

Warming and sea level rise caused by human activities will continue for centuries, even if greenhouse gas concentrations were to be stabilized. If warming persists over many centuries, it could lead to a complete melting of the Greenland Ice sheet, increasing global sea levels by about 7m.

Observed impacts of climate change

Regional climate change is already affecting many natural systems. For instance, it is increasingly being observed that snow and ice are melting, and frozen ground is thawing, hydrological and biological systems are changing and in some cases being disrupted, migrations are starting earlier, and species' geographic ranges are shifting towards the poles.

Despite remaining gaps in our knowledge, it is likely that these effects are linked to human influence on climate. At the regional level, however, responses to natural variability are difficult to separate from the effects of climate change.

Some previously unanticipated impacts of regional climate change are just starting to become apparent. For instance, melting glaciers can threaten mountain settlements and water resources, and damages associated with coastal flooding are increasing.

Future impacts

Over the course of the 21st century, many impacts are expected to occur in natural systems. For instance, changes in precipitation and the melting of ice and snow are expected to increase flood risks in some areas while causing droughts in others. If there is significant warming the capacity of ecosystems to adapt will be exceeded, with negative consequences such as an increased risk of extinction of species. The most vulnerable people are in general the poor, since they have less capacity to adapt, and their livelihoods are often dependent on resources that are linked to climate. Africa is found to be particularly vulnerable to climate change, because of existing pressures on its ecosystems and its low capacity to adapt. On all continents, water supply and the threat to coastal areas will be an issue. Overall future impacts are expected to be negative, although some positive effects are also expected initially, such as an increase in agricultural productivity at high latitudes accompanying a moderate warming, or decreased heating needs in cold regions.

Impacts will depend on the magnitude of the temperature increase. For instance, some crops at mid- to high latitudes will have higher productivity if local temperature increases by 1-3 °C, but will be negatively affected beyond that. If higher temperatures persist after the 21st century it could result in very large impacts. For instance, the large sea-level rise that would result from the melting of the Greenland and Antarctic ice sheets would have major repercussions on coastal areas. The cost associated with the effects of climate change is projected to increase over time with rising temperatures.

A projected increase in the severity and frequency of droughts, heat waves, and other extreme weather events is expected to cause major impacts over the course of this century.

Human Adaptation to climate change

Human's stance through technological solutions such as coastal defences and changes in consumption habits. Humans are already adapting to climate change, and further adaptation efforts will be necessary during coming decades. However, adaptation alone is not expected to be able to cope will all projected effects since the options diminish and the costs increase with rising temperatures.

Vulnerability of human populations to climate change and its consequences can be affected by other factors, such as pollution, conflicts, or epidemics such as AIDS. An emphasis on sustainable development can help human societies reduce their vulnerability to climate change. However, climate change itself can become an impediment to their development.

Mitigation measures that aim to reduce emissions can help avoid, reduce or delay impacts, and should be implemented in order to ensure that adaptation capacity is not exceeded.

Current trends in greenhouse gas emissions

Global greenhouse gas emissions have grown markedly since pre-industrial times, with a 70% increase from 1970 to 2004 alone. Over this period, emissions from the transport and energy sectors

have more than doubled. Policies put in place in some countries have been effective in reducing emissions in those countries to a certain degree, but not sufficiently to counteract the global growth in emissions.

Without additional measures to mitigate climate change, global green house gas emissions will continue to grow over the coming decades and beyond. Most of this increase would come from developing countries, where per capita emissions are still considerably lower than those in developed countries.

Measures needed to reduce greenhouse gas emissions

Mitigation measures to reduce greenhouse gas emissions have a certain cost. However, they also constitute an economic benefit by reducing the impacts of climate change, and the costs associated with them. In addition, they can bring economic benefits by reducing local air pollution and energy resource depletion.

If the benefits of avoided climate change are taken into account and a "carbon price" is established for each unit of greenhouse gas emissions, this could create incentives for producers and consumers to significantly invest in products, technologies and processes which emit less greenhouse gases. The resulting mitigation potential is substantial and could offset the projected growth of global emissions over the coming decades or reduce emissions below current levels.

Mitigation measures could contribute to stabilizing the concentration of greenhouse gases in the atmosphere by 2100 or later. To achieve low stabilization levels, stringent mitigation efforts are needed in the coming decades. This could reduce global GDP by up to a few percent.

Changes in lifestyle and behaviors that favor resource conservation can contribute to climate change mitigation. Mitigation measures can also have other benefits for society, such as health cost savings resulting from reduced air pollution. However, mitigation in one country or group of countries could lead to higher emissions elsewhere or effects on the global economy.

No one sector or technology can address the entire mitigation challenge. All sectors including buildings, industry, energy production, agriculture, transport, forestry, and waste management could contribute to the overall mitigation efforts, for instance through greater energy efficiency. Many technologies and processes, which emit less greenhouse gases are already commercially available or will be in the coming decades.

In order to stabilize the concentration of greenhouse gases in the atmosphere, emissions would have to stop increasing and then decline. The lower the stabilization level aimed for, the more quickly this decline would need to occur. Worldwide investments in mitigation technologies, as well as research into new energy sources, will be necessary to achieve stabilization. Delaying emission reduction measures limits the opportunities to achieve low stabilization levels and increases the risk of severe climate change impacts.

Incentives for mitigation

A wide variety of policy tools can be applied by governments to create incentives for mitigation action, such as regulation, taxation, tradable permit schemes, subsidies and voluntary agreements. Past experience shows that there are advantages and drawbacks for any given policy instrument. For instance, while regulations and standards can provide some certainty about emission levels, they may not encourage innovations and more advanced technologies. Taxes and charges, however, can provide incentives, but cannot guarantee a particular level of emissions. It is important to consider the environmental impacts of policies and instruments, their cost effectiveness, institutional feasibility and how costs and benefits are distributed.

Although the impact of the Kyoto protocol's first commitment period 2008-2012 on global carbon emissions is expected to be limited, it has allowed the establishment of a global response to the climate problem as well as the creation of an international carbon market and other mechanisms that may provide the foundation for future mitigation efforts.

Switching to more sustainable development paths can make a major contribution to climate change mitigation. Policies that contribute to both climate change mitigation and sustainable development include those related to energy efficiency, renewable energies, and conservation of natural habitats. In general, sustainable development can increase the capacity for adaptation and mitigation, and reduce vulnerability to the impacts of climate change.

Conclusions

Current warming trends are unequivocal. It is very likely that greenhouse gases released by human activities are responsible for most of the warming observed in the past fifty years. The warming is projected to continue and to increase over the course of the 21st century and beyond.

Climate change already has a measurable impact on many natural and human systems. Effects are projected to increase in the future and to be more severe with greater increases in temperature. Adaptation measures are already being implemented, and will be essential in order to address the projected consequences. There is, however, a limit to adaptation; mitigation measures will also be needed in order to reduce the severity of impacts.

Mitigation measures that aim to reduce greenhouse gas emissions can help avoid, reduce or delay many impacts of climate change. Policy instruments could create incentives for producers and consumers to significantly invest in products, technologies and processes which emit less greenhouse gases. Without new mitigation policies, global greenhouse gas emissions will continue to grow over the coming decades and beyond. Rapid world-wide investments and deployment of mitigation technologies, as well as research into new energy sources will be necessary to achieve a stabilization of the concentration of greenhouse gases in the atmosphere.

Additional research addressing gaps in knowledge would further reduce uncertainties and thus facilitate decision-making related to climate change.

Agriculture: 50 Years From Now

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Agriculture has been the cornerstone of human success since the dawn of human civilization in every corner of the planet. However, in the future, several factors could pose serious challenges to agricultural practices, such as lack of an opportunity to expand land areas used for agriculture without disturbing virgin forest areas; our ability to effectively meet demands for food by the ever increasing human population; our ability to meet demands for a reduction in the use of agro-chemicals for ecological concerns; our ability to address environmental issues such as our contribution to global warming through cattle ranching and production of certain crops and our ability to reduce surface run off contamination from agricultural fields polluting adjacent freshwater and groundwater resources. Additionally, our ability to respond to fluctuating weather patterns and sporadic outbreaks of pests and diseases will also demand attention.

Future success in agriculture will depend upon judicious and industrious use of available resources and efficient use and integration of newer technologies. Biotechnology is expected to play a big role in producing genetically engineered designer crop varieties that are resistant to a multitude of diseases, adapted to different stress environments, have high yield attributes and can grow even under low agricultural input of under developed countries and enhance food security.

The recent *biofuel frenzy* may change the equation of balance among production of different crop varieties upside down. Although the economics of producing so called *biofuel* is much higher than conventional non-renewable fuel resources, it is currently looked at from a positive environmental perspective only. It may be a nice alternative in theory; but such ambitious industrial scale bio-ethanol production may have serious future implications to agriculture at large and impact the society in a big way. Farmers may prefer to grow only high value cash crops (like biofuel crops). This could lead to initial financial success on one hand, but very serious long term threats to global food security on the other. Giant multinational companies would heavily invest in buying cheap land and labour in the developing or under developed countries to keep the crop production cost low to maximize their profits from ethanol production. Many poor farmers may fall victim to their lucrative and aggressive economic trap and lose both their land and income over short term interest permanently. Higher incomes in Asia and ethanol subsidies in America have put an end to the falling food prices. Increasing wealth in upcoming giant economies like that of China will demand more meat in future which in turn could possibly place increased demands for more grains to feed these animals. While in 1985, per capita consumption of meat per annum was 20 kg in China; in 2007 it has been around 50 kg per capita per year. A shift in diet is multiplied many times in grain markets- 3 kg of cereals produce 1 kg of pork, while 8 kg of grains produce 1 kg of beef.

Agricultural economists feel that such agriculture induced inflation may have serious negative impacts on the economic growth of several countries in not so distant future. The higher expenditure to be incurred due to limited availability of land resources for growing food crops and enhanced cost of advanced technology-dependent agronomic practices may force new farmers to look for alternative jobs in developed countries may lead to financial crises and social unrest in poorer countries. Without long term policy and technological innovations to support the current level of productivity (suitable both for developed and under developed countries), the future of agriculture may not be that rosy.

The Vista of Palynological Science - An assay

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The science of Palynology covers the study of pollen grains and spores, which are the reproductive/propagative units in the plant kingdom. Coming to pollen grains alone (of flowering plants) it may be understood that the pollen unit is a partner in plant of reproductive biology and subsequent production of fruits and seeds. The pollen unit is a microscopic single cell system with the special feature that the genomic material (nucleus and cytoplasm) is enveloped by a wall, the *exine* which is both protective and diagnostic of the mother plant it belongs to. Thus, it has an identity of its own with built in characteristics for use in plant taxonomy and evolution on the one hand and for use in a variety of areas of scientific interest with social and economic interventions.

In the scheme of pollen biology, the haploid pollen develops in a diploid environment (tapetum) and on maturity it is released from the anther for being carried by various agencies (air, insects, water etc.), the direct consequence of which is pollination of the female counterpart for the production of fruits and seeds. For the fertilization process, only a minutesimal quantum of the pollen produced by any one plant species is actually what is required and the excess pollen are taken to a spectrum of situations in each of which they provide the material for new research enquiries and applications thereon. Thus, the airborne pollen becomes a factor in human allergy, the insect form the food for the bee larvae and yet others become deposited in sedimentary areas to become fossils. The pollen spore (including fungal spore) distribution is finding its presence in a spectrum of situations in each of which it becomes an index for bio-prospecting.

In the above background it indicates that the science of Palynology could be categorized into the following broader areas of scientific research and also education namely

1. Morphology and evolutionary biology; 2. Plant reproductive biology and pollination ecology; 3. Physiology and biotechnology; 4. Aerobiology and allergy; 5. Bee botany and nutrition; 6. Energy resources (fossil fuels and geo-prospecting); 7.Technology and product development; 8. Palynological education; 9. Socio-economic studies.

We may elaborate the socio-economic agenda as covering agriculture, forestry, industry, human health and medicine (forensic science, respiratory allergy, honey/pollen food), cosmoceuticals/ nutraceuticals, phytomedicals (pharmacognosy, genetic resources screening) pollination technology, oil exploration and coal stratigraphy, among the many other areas of interest. In terms of biotechnology the importance of haploid plant production and the knowledge on male specific genes for plant improvement including disease control is quite significant. The air borne pollen aerosols arc not only of interest in respiratory allergy therapy, but also important in space research programmes. With regard to products the most significant is honeys and honey products in which the pollen is the only material with an identity, helping to notify ecosystem specificity and standardization along new lines. Further the pollen-spore antigen is an important product in the world pharmaceutical market.

The assay implies that Palynological Science is all about a hidden agenda of biological processes in the plant body tuned to conform with the environmental conditions and ecosystem design in time and space, with the reproductive machinery as the focus of genetic variations. The architecture of the spore-pollen unit alone reflects the genetic lineage, facilitating the reconstruction of plant evolution (biodiversity in the broader perspective) through the Ages, at the same time as providing new opportunities in pollen management, to human advantages in addressing an array of biological and sustainable development isues. Thus the expanding, Vista of Palynological Science offers new hopes and challenges in research and development pursuits.

NEWS AND VIEWS

POLLUTION HAZARDS FROM GLOBAL SHIPPING

The number of people who died from heart and lung diseases as a result of under-regulated shipping emissions totaled 64,000 and the death toll is estimated to be nearly 90,000 by 2012 due to continued rapid growth in global shipping. Ship pollution affects the health of communities in coastal and inland regions around the world, yet pollution from ships remains one of the least regulated parts of our global transportation system.

The researchers used the most recent global inventions of ships' emissions of fine particulate matter (PM), sulphur dioxide SO_2 and nitrogen oxides (NO_x). Through chemical reactions in the air, SO_2 and NO_x is being converted into fine particles, sulphate and nitrate aerosols. The ting airborne particles get into the lung and are small enough to pass through tissues and enter the blood. They can then trigger

inflammations which eventually cause heart and lung failures. Ship emissions may also contain carcinogenic particles.

More than half of the world's population lives in coastal regions and nearly 70% of ship emissions occur within 400 kilometres of land. The health impacts are concentrated in coastal regions along major trade routes. East Asia and South Asia were the most heavy impacted.

Diesel-powered ocean-going ships burn some of the dirtiest fuel available on average, ship diesel fuel has 2000-3000 the sulphur content of high way diesel fuel in U.S.A. and Europe. While air pollution from diesel trucks and buses on land has been reduced by 90% over the last few decades, emissions from international ships using similar diesel engine technology have risen virtually unchecked. Drastic cuts in air pollution emissions from shipping are essential and urgent. Moving to cleaner marine fuels is inevitable to quickly reduce emissions from ships.

Christer Agren
(Acid News)
Source: "Mortality from ship emissions: A global assessment"
By J. Corbett, et al.,
Environmental Science & Technology

CHROMIUM TOXICITY IN TEA LEAVES

Our tea contains chromium, which may cause cancer and skin diseases. The heavy metal gets into the leaf when the tea are processed using the 'crush, tear and curl' method. The tea industry has been using the CTC process since the 1950s. A series of stainless steel rollers with hundreds of small sharp blades turn tea leaves into granules making them easy to brew and bag. The rollers contain 17% chromium, which combines with oxygen and forms a thin layer of oxide on it. As the rollers need to be sharpened periodically the passive film is disrupted and leads to the release of chromium into the tea leaves that come into contact with the metal. The juices extruded by tea leaves during processing make contamination easier. It is yet to be found out whether the chromium in the tea is trivalent or hexavalent. Hexavalent chromium poses serious health hazards. The study is carried out by the Pesticide Residue Laboratory of "UPASI Tea Research Foundation in Valparai, Tamil Nadu, India.

Source**: *Down to Earth***

PLANTS TRICKED INTO CLEAN-UP ACT

U.S. and British researchers have figured out a way to trick plants into doing the duty work of environmental clean up. Researchers at the University of Washington have genetically allured poplar trees to pull toxins out of contaminated ground water, offering accost-effective way of cleaning up environmental pollutants. A group of British experts, meanwhile, has developed genetically altered plants that can clean residues of mines explosives from the environment. The research is part of an emerging area of study known as phytoremediation, which aims to use trees, grasses and other plants to remove hazardous materials. Phytoremediation is basically a solar-powered pollutant, removal system. It uses the plant's natural ability to extract chemical from water, soil and air, genetically modified poplar trees sucked 91% the toxin triclorethylene from a liquid solution. Natural plants were only able to remove 3% toxin, which is the most common groundwater contaminant in the U.S. using plants to do environmental clean up is more than 10 times cheaper than other technologies.

PHASING OUT INCANDESCENT BULBS TO CUT GREENHOUSE GAS EMISSIONS

Philippines is the first Asian country which has planned to phase out inefficient incandescent bulbs in favor of more energy-efficient compact fluorescent lamps (CFLs) that will reduce greenhouse gas emissions and cut household energy costs.

Asian Development Bank, Manila is considering extending a $ 30 million loan to the Philippines to help fund a range of programs on energy efficiency. Portions of the ADB funding could be used to provide CFLs to low-income families to mitigate the impact of the change from incandescent lighting.

While CFLs are more expensive to buy than incandescent bulbs, they pay for themselves in lower power bills within a year. CFLs use around 20% of the electricity used by incandescent bulbs to produce the same amount of light. Additionally, CFLs last six to ten times longer than the average incandescent bulb.

The switch to CFLs will result in household lighting costs falling by as much as 80%, and the country's annual greenhouse gas (GHG) emissions falling 2 million metric tons starting in 2010. Additionally, national electricity demand is expected to fall by 2,000 megawatts, or the equivalent of electricity generated by six power plants. Electric lighting generates emissions equal to 70% of those from all the world's passenger vehicles, and 90% of the energy consumed by each incandescent bulb generate heat, which then adds to air-conditioning costs.

ADB News Alert

CAR EXHAUST FUMES CAUSE HEART ATTACK

Dr John Incardona, a biologist and toxicologist at the West Coast Centre for Oceans and Human Health, in Seattle, said that the research suggests that millions of people living in large cities are effectively breathing an aerosolized oil spill.

Polycyclic Aromatic Hydrocarbons (PAHs) are compounds released during the combustion of fossil fuels. In the study, the researchers exposed zebrafish embryos to the most abundant PAHs found in oil and petrol, and found that PAHs caused the developing heart to beat more weakly and with an abnormal

rhythm. A failure to pump properly caused fluid build-up.

The available data suggests that these PAHs are present in burning oil in levels high enough to result in pharmacologically active levels in the human blood stream. Once in the bloodstream, they are likely to be toxic to the human heart, and should be considered prime suspects for the health effects of urban air. In essence, people in big cities are breathing an aerosolized oil spill.

A physician who knowingly gave an aerosolized particle toxin to a patient with coronary artery disease or congestive heart failure would probably be sued for malpractice. But the air in our cities is doing just that to millions every day unknowingly. It turns out that fish hearts even in the embryo function more like human hearts than even mice or rats, the usual test animals in human health studies.

Every time we burn something we generate PAHs. The smaller PAHs have been largely ignored because they are not carcinogenic. The study was presented at the Annual Association for the Advancement of Science (AAAS) conference in Boston recently.

Times of India

BABY BOTTLES LEACH TOXIC CHEMICAL

Studies carried out recently in U.S.A. and Canada have demonstrated the toxic hazards of bisphenol A (BPA) which is used in bay bottles and other food and beverage containers. BPA is also used to make hard plastic used in some toddler sippy cups, polycarbonate water bottles, dental sedants and the linings of many food and beverage cans. BPA leaches from plastic baby bottles when heated. When new bottles are heated, they leached between 4.7-8.3 parts per billion of BPA. Recent research on animals shows at doses below these levels, BPA can harm health by disrupting development. BPA is a synthetic sex hormone that mimics estrogen, and is used to make hard polycarbonate plastic. Ninety five percent of all baby bottles in the market are made with BPA. Studies conducted on the laboratory animals have also linked low doses of BPA to obesity, diabetes, thyroid diseases, breast cancer, prostate cancer and many other diseases.

Source: ***http://www.oeconline.org***

GUAVA PLANT - A BIOINDICATOR OF OZONE

Guava plants have been found to be good bio-indicators of ozone pollution in the tropics. In a study carried out at the Department of Botany, University of Sao Paulo, Brazil by Furlan, Moraes, Bulbovas, Domingos, Salatino and Sanz also reported in the Journal of Environmental Pollution, the scientists exposed the saplings of guava (*Psidium guajava*) to filtered air, ambient non-filtered air and non-filtered air + 40 parts per billion ozone. Ozone injury symptoms like interveinal red stipplings appeared after 5 days in plants exposed to ozone and after 40 days in plants exposed to non-filtered air. Plant samples exposed to filtered air did not show any injury symptoms.

Source: ***Environmental Pollution***

ANTIBACTERIAL CHEMICALS FROM INSECT EATING PLANTS

Enzymes from insect-eating plants could give us new antibacterial products. Some Japanese researchers have discovered enzymes in the digestive fluids of carnivorous pitcher plants that could prove useful in controlling infections. Most plants support their growth by absorbing nutrients from the soil. But such plants live in regions where soils lack these nutrients and in such plants alternative arrangements have evolved such as organs that can catch, kill and digest insects.

Pitcher plant (*Nepenthes alata*) has a slippery pitcher that functions like pit trap. This plant uses a combination of bright colours and sweet scent to attract insects to the pitcher, where slippery side walls and a deep pit filled with acidic fluid trap and kill the victims.

The fluid at the base of the trap had long been thought to contain digestive enzymes. But exactly which enzymes were present was not known. Digestion in pitcher plants has been actively studied for more than 150 years and we still don't know how it works because it is complex process. Now Japanese scientists have identified seven proteins in the carnivorous plant's fluid. They found that while three of the enzymes are capable of digesting insects, the remaining ones probably play a role in preservation of prey because they are closely related to enzymes that prevent fungal and bacterial infections in other plants.

The concept of preservational enzymes in digestive juice may not at first make sense, but these plants consume insects very slowly, so they compete with bacteria that grow on the insect, stealing the nutrients from the plant. Covering the prey with antibacterial enzymes leaves more insects for the plant to drain of nutrients later. These enzymes could potentially be useful in preventing bacterial and fungal infections. However, further research is needed for their full potential to be realized in agriculture and medicine.

Source: ***Nature News***

CLIMATE CHANGE HEALTH AND ENVIRONMENTAL EFFECTS

The overwhelming majority of studies of regional climate effects on terrestrial species reveal consistent responses to warming trends, including poleward and elevational range shifts of flora and fauna. Responses of terrestrial species to warming across the Northern Hemisphere are well documented by changes in the timing of growth stages (i.e, phenological changes), especially the earlier onset of spring events, migration, and lengthening of the growing season (IPCC, 2007).

An ecosystem is an interdependent, functioning system of plants, animals

and microorganisms. An ecosystem can be as large as the Mojave Desert, or as small as a local pond. Without the support of the other organisms within their own ecosystem, life forms would not survive, much less thrive. Such support requires dead predators and prey, fire and water, food and shelter; clean air and open space remain in balance with each other and with the environment around them.

Climate is an integral part of ecosystem and organisms have adapted to the regional climate over time. Climate change is a factor that has the potential to alter ecosystem and the many resources and services they provide to each other and to society.

In various regions across the world, some high-altitude and high latitude ecosystems have already been affected by changes in climate. The Intergovernmental Panel on climate Change reviewed relevant published studies of biological systems and concluded that 20 percent of species assessed may be at risk of extinction from climate change impacts within this century if global mean temperatures exceed 2-3 ^{0}C (3.6-5.0 ^{0}F) relative to pre-industrial levels (IPCC, 2007).

These changes can cause adverse or beneficial effects on species. For example, climate change could benefit certain plant or insect species by increasing their ranges. The resulting impacts on ecosystems and humans, however, could be positive or negative depending on whether these species were invasive (e.g. weeds or mosquitoes) or if they were valuable to humans (e.g. food crops or pollinating insects). The risk of extinction could increase for many species, especially those that are already endangered or at risk due to isolation by geography or human development, low population numbers, or a narrow temperature tolerance range.

Observations of ecosystem impacts are difficult to use in future projections because of the complexities involved in human/nature interactions (e.g. land use change). Nevertheless, the observed changes are compelling examples of how rising temperatures can affect the natural world and raise questions of how vulnerable populations will adapt to direct and indirect effects associated with climate change.

During the course of this century the resilience of many ecosystems (their ability to adapt naturally) is likely to be exceeded by an unprecedented combination of change in climate and in other global change drivers (especially land use change and overexploitation), if greenhouse gas emissions and other changes continue at or above current rates. By 2100 ecosystem will be exposed to atmospheric CO_2 levels substantially higher than in the past 650,000 years, and global temperatures at least among the highest as those experienced in the past 740,000 years. This will alter the structure, reduce biodiversity and perturb functioning of most ecosystems, and compromise the services they currently provide.

DIESEL FUMES CAN HARM OUR BRAIN

Inhaling diesel exhaust triggers a stress response in the brain that may have damaging long-term effects on brain function, according to researches carried out by Dutch scientists recently. Previous studies have found very small particles of soot, or nanoparticles, are able to travel from the nose and lodge in the brain. But this is the first time researchers have demonstrated a change in brain activity.

We can only speculate what these effects may mean for the chronic exposure to air pollution encountered in busy cities where the levels of such soot particles can be very high It is conceivable that the long-term effects of exposure to traffic nanoparticles may interfere with normal brain function and information processing.

Paul Borm and his team at Zuyd University, put 10 volunteers in a room filled with exhaust from a diesel engine for one hour and monitored their brain waves with an electroencephalograph (EEG). The level of fumes was similar to that found on a busy road or in a garage. After about 30 minutes, brain wave patterns displayed a stress response, suggesting changes in information processing in the brain cortex.

Further research is needed to determine the clinical effect of this stress and whether it has any long-term impact on verbal and non-verbal intelligence or memory abilities. Still, the result appears to be another black mark for nanoparticles found in traffic fumes, which have already been linked with increased rates of respiratory and cardiovascular disease.

Source: ***Reuters***

RAIN-MAKING BACTERIA FOUND

The bacteria that cause frost damage on plants can help clouds to produce rain and snow. Studies on freshly fallen snow suggest that bio-precipitation might be much more common than was suspected. Before a cloud can produce rain or snow, rain drops or ice particles must form. This requires the presence of aerosols, the tiny particles that serve as the nuclei for condensation. Most such particles are of mineral origin, but airborne microbes bacteria, fungi or tiny algae can do the job just as well. Unlike mineral aerosols, living organisms can catalyse ice formation even at temperatures close to 0 ºC. The effect of the biological 'ice nucleators' on precipitation has been a mystery but now microbiologists at Lousiana State University have managed to catalogue these rain-making microbes by looking at fresh snow samples collected at various mid- and high altitude locations in North America, Europe and Antarctica.

Their findings add evidence to the idea that microbes can safely travel long distances in clouds and suggest that substantial biology driven precipitation occurs everywhere on Earth.

Source:***Nature News***

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ISBN: 978-1-84564-115-3
Price: £198.00/US $396.00/€ 297.00

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Printed and Published by`
Dr. K.J. Ahmad
for International Society of Environmental Botanists, National Botanical Research Institute, Rana Pratap Marg, Lucknow-226 001, India
Tel. 2205831-35 Extn. 223
Fax : 2205836
E-mail : isebnbrilko@satyam.net.in
Website : http://isebindia.com

Printed by Maruti Scanners, Lko. Tel.: 0522-4001895, 9839055651, 9889365911