ENVIRONMENTAL POLLUTION, TOXICOLOGY AND SUSTAINABLE DEVELOPMENT

INVITED TALK

SCHOOL OF ENVIRONMENTAL SCIENCES
JAWAHARLAL NEHRU UNIVERSITY
MARCH 3, 2020

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AMITY INSTITUTE OF ENVIRONMENTAL SCIENCE, AMITY INSTITUTE OF ENVIRONMENTAL TOXICOLOGY, SAFETY AND MANAGEMENT, AMITY INSTITUTE OF WATER TECHNOLOGY AND MANAGEMENT, AMITY CENTER FOR ANTARCTICA RESEARCH AND STUDIES
AMITY UNIVERSITY UTTAR PRADESH, SECTOR 125, NOIDA 201313
Environmental Toxicology

Ecotoxicology - ‘study of impacts of pollutants on the structure and function of ecosystems’

Manmade poisonous chemicals and their effect on the environment, it does not include the study of naturally occurring toxins, for example cholera toxin, or brevitoxin

Environmental Toxicology is the study of the effects of incidental exposure of organisms and ecosystems to toxins in the environment (air, water and food). It includes cause and effect-analysis of environmental contaminants (e.g. PAH’s, PCB’s, pesticides, heavy metals, dioxins/dibenzofurans etc.) and their impact on eco-system (soil, water, air, flora and fauna)
Environmental Toxicology is a highly interdisciplinary field
A toxic substance produces its adverse effect by interacting with humans (or organisms) and the environment in a relationship referred to as “the toxic triangle”
**Decision Making**

- **General public**
  - Nongovernmental organizations, citizens groups, watershed associations, rotary clubs etc.
  - Media, newspapers, television, internet

- **Scientific community**
  - Publication of papers
  - Participation in the peer review process
  - Review panels

- **Industry**
  - Pollution prevention, identification and/or remediation
  - Efficacy testing of new pesticides or herbicides
  - Health and safety

- **Government and regulatory agencies**
  - Representatives of the legislatures, court or the executive
  - Federal (USEPA Canadian Fisheries and Oceans)
  - State provincial
  - Local (cities, counties, water, districts)

- **Risk assessment**
  - Identification of effects and associated uncertainty
  - Quantification of interactions between chemicals and other environmental stressors

- **Research programs**
  - Identification of toxicity and mechanisms
  - Identification of potential effects from the molecular to the ecological
  - Development of testing methods, analytical tools, statistical approaches
  - Construction of useful programs and models

**Environmental Toxicology**
Environmental Toxicology Depends on

- Lab work
  - Effects of toxicants on biochemistry and physiology
- Field work
  - Field observations of reproduction and survival in polluted vs. non-polluted sites
- Modeling of fate and transport of toxicants in the environment i.e. exposure and risk assessment
- Static models: short term modeling of ecosystems
- Strategic models: model of a specific aspect of a system
- Testable models: model makes predictions that can be tested in the field or laboratory
• Purpose/function of environmental toxicology is to

– Identify the mode / site of action of a xenobiotic
– FATE and TRANSPORT / interaction of a xenobiotic with the biosphere (including specific organisms) after it is released / pollution occurs
– identify the effect the xenobiotics has on ecosystems / higher level organization e.g. loss of fertility of Alligators in Lake Apopca
Parameters of xenobiotics interaction with the ecosystem

- **Introduction of xenobiotic**
  - DNA
  - RNA
  - Receptors
  - Key enzymes
  - Biochemical integrity

- **Physiology, Behavior**
  - Chromosome damage
  - Lesions, Necrosis
  - Tumors
  - Teratogenic effects
  - Behavior, Mortality

- **Community structure**
  - Diversity
  - Energy transfer
  - Stability
  - Succession
  - Chemical parameters

**Ecosystem effect**

- **DNA**
- **RNA**
- **Receptors**
- **Key enzymes**
- **Biochemical integrity**

- **Stress proteins**
- **Metabolic indicators**
  - Acetylcholinesterase inhibition
  - Adenyl energy charge
  - Metallothionen production
  - Immuno suppression

- **Population density**
  - Productivity
  - Mating success
  - Fecundity
  - Genetic alterations
  - Competitive alterations

**Enzyme induction**
- Glutathione S Transferase
- Mixed Functional Oxidases
- Hydrolases
- DNA repair mechanisms
Environment Toxicological Studies for Sustainable Development

• There has been a sharp increase in the use of harmful chemicals like pesticides, fertilizers, poly aromatic hydrocarbons (PAH), poly chlorinated biphenyls, cosmetics, medicines and other radioactive nuclei which ultimately affect the environment adversely.

• Such toxins accumulate in the environment and enters the various food chains in the ecosystems and threaten the survival of many organisms.
• It is essential to study the pathways of toxicants being distributed within the food chains and the responses of the toxic pollutants to the ecosystems.

• Chemicals may make our life easier but on the same side, such chemicals may affect our health when such chemicals become pollutant to the environment and may pose major risk to each and every living organism.

• Therefore a multidisciplinary study of environmental toxicology which deal with the various harmful effects of chemicals, biological and physical agents on living organisms becomes important.
• These studies are important for sustainable development in view of increasing diseases and along with disorders and deterioration of environment and to solve the complex health and environmental problems.
• With the increase of population and urbanization the growing litany of environmental problems are compelled to re-examine and rationalize for the sustainability.
Environmental Institutes at Amity University, Noida

- Amity Institute of Environmental Toxicology, Safety and Management
- Amity Institute of Environmental Sciences
- Amity Institute of Natural Resources and Sustainable Development
- Amity Institute of Geo-Informatics and Remote-Sensing
- Amity Institute of Global Warming and Ecological Studies
- Amity Institute of Wildlife Sciences
- Amity Institute of Green Technology Research & Studies
- Amity Institute of Water Technology and Management
- Amity Centre for Antarctica Research and Studies
- Amity Centre for Environmental Health and Science
Environmental Courses

- PhD. Environmental Sciences (Full Time, Part time)
- PhD. Geo-Informatics and Remote-Sensing (Full Time, Part time)
- M.Sc. Environmental Sciences
- B.Sc. Environmental Sciences
- M Tech. Environmental Engineering
- M Tech. Geo-Informatics and Remote-Sensing
- MBA Natural Resource and Management
- Ph.D. Natural Resource and Management
- UGC Environmental Science course credits to all undergraduate students (approx. 5,000) in two semesters

New Environmental Courses

- M.Sc. Environmental Health Science & Management
- M. Tech. Water Technology & Management
- PG Diploma in Environmental Impact Assessment & Auditing
- PG Diploma in Climate Change, Adaptation & Mitigation
- PG Diploma in Disaster Management

Environmental Courses (Gurugram)

- M.Sc. Environmental Sciences and Management
- M. Tech. Atmospheric Technology and Climate Management
- PhD. Environmental Sciences
- PhD. Environmental Sciences (Part Time)
ONGOING PROJECTS

10th Indian Scientific Expedition to Southern Ocean

Screening of Microorganism From Indian Sector of Southern Ocean for Antimicrobial activity with their molecular Characterization
34th and 35th India Scientific Expedition to Antarctica as part of the NCAOR programme on environmental monitoring
### POP’s Results from Broknes Peninsula

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<th>S.No</th>
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<th>L1C NG (pg/ml)</th>
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<th>L1E NG (pg/ml)</th>
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<td>21.67</td>
<td>12.67</td>
<td>0.00</td>
</tr>
<tr>
<td>23</td>
<td>2,2',3,4,5,6'-Hexachlorobiphenyl (PCB 143)</td>
<td>0.00</td>
<td>30.33</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>10.33</td>
<td>10.33</td>
<td>0.00</td>
</tr>
<tr>
<td>24</td>
<td>2,2',4,4',5,5'-Hexachlorobiphenyl (PCB 153)</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>25</td>
<td>2,2',3,3',4,4',5-Heptachlorobiphenyl (PCB 170)</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>26</td>
<td>2,2',3,4,4',5,5'-Heptachlorobiphenyl (PCB 180)</td>
<td>12.00</td>
<td>10.33</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>27.67</td>
<td>23.00</td>
<td>0.00</td>
</tr>
<tr>
<td>27</td>
<td>2,2',3,4,4',5,5'-Octachlorobiphenyl (PCB 194)</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>
Ambient air quality - cumulative percentile of suspended particulate matter in Antarctica

<table>
<thead>
<tr>
<th>Location</th>
<th>Min</th>
<th>Avg.</th>
<th>Cumulative Percentiles</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Near Aditya generator</td>
<td>32.0</td>
<td>45.3</td>
<td>47.0</td>
<td>57.0</td>
</tr>
<tr>
<td>Near Bhaskara generator</td>
<td>52.0</td>
<td>61.3</td>
<td>62.0</td>
<td>70.0</td>
</tr>
<tr>
<td>Near Boiler exhaust</td>
<td>42.0</td>
<td>49.3</td>
<td>48.0</td>
<td>58.0</td>
</tr>
<tr>
<td>Near Workshop</td>
<td>5.0</td>
<td>7.0</td>
<td>7.0</td>
<td>9.0</td>
</tr>
<tr>
<td>Near helipad</td>
<td>9.0</td>
<td>10.3</td>
<td>10.0</td>
<td>12.0</td>
</tr>
<tr>
<td>Downwind of toilet</td>
<td>15.0</td>
<td>18.3</td>
<td>18.0</td>
<td>22.0</td>
</tr>
<tr>
<td>modules of summer-camp*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upwind direction of Maitri station</td>
<td>3.0</td>
<td>4.7</td>
<td>5.0</td>
<td>6.0</td>
</tr>
</tbody>
</table>

Note: All values expressed as 24 hourly averages in mg/m³; *Located approx. 100m from Maitri station
Installation of Air Pollution Monitoring Equipment at Amity Campus from Uttar Pradesh Pollution Control Board
# Monitored Parameters

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Measurement Techniques</th>
<th>Instrument Model</th>
<th>Instrument Make</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inorganic Pollutants</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Particulates (PM$<em>{10}$ &amp; PM$</em>{2.5}$)</td>
<td>Beta ray Attenuation</td>
<td>Spirant BAM</td>
<td>ECOTECH, Australia</td>
</tr>
<tr>
<td>SO$_2$</td>
<td>Pulsed fluorescence</td>
<td>Serinus 50</td>
<td>ECOTECH, Australia</td>
</tr>
<tr>
<td>NO, NO$_2$, NO$_x$, &amp; NH$_3$</td>
<td>Chemiluminescence</td>
<td>Serinus 44</td>
<td>ECOTECH, Australia</td>
</tr>
<tr>
<td>CO</td>
<td>Non Dispersive Infrared</td>
<td>Serinus 30</td>
<td>ECOTECH, Australia</td>
</tr>
<tr>
<td>O$_3$</td>
<td>UV Absorption</td>
<td>Serinus 10</td>
<td>ECOTECH, Australia</td>
</tr>
<tr>
<td><strong>Organic Pollutants</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BTX</td>
<td>GC PID</td>
<td>GC 955 601</td>
<td>Synspec Netherlands</td>
</tr>
<tr>
<td><strong>Meteorological Parameters</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature (°C)</td>
<td>Thermistor</td>
<td>083E-1-35</td>
<td>Met One USA</td>
</tr>
<tr>
<td>Relative Humidity (%)</td>
<td>Capacitor</td>
<td>083E-1-35</td>
<td>Met One USA</td>
</tr>
<tr>
<td>Barometric Pressure (mm Hg)</td>
<td>Pressure Transducer</td>
<td>092</td>
<td>Met One USA</td>
</tr>
<tr>
<td>Solar Radiation (Watts/m$^2$)</td>
<td>Photo Cell</td>
<td></td>
<td>Envirotech India</td>
</tr>
<tr>
<td>Wind Direction (Degrees)</td>
<td>Potentiometer</td>
<td>MSO-232(366-3)</td>
<td>Met One USA</td>
</tr>
<tr>
<td>Wind Speed (m/sec)</td>
<td>Anemometer</td>
<td>MSO-232(366-3)</td>
<td>Met One USA</td>
</tr>
<tr>
<td>Rain Fall (mm)</td>
<td>Tipping Bucket</td>
<td></td>
<td>Envirotech India</td>
</tr>
</tbody>
</table>
• Ozone Trend- Amity University, Noida
  • (1/9/2018 to 30/9/2018)
Ozone Trend - Amity University, Noida
(29/09/2018)
Ozone Trend - ITO, Delhi (01/09/2018 to 30/09/2018)

Permissible limit: 100µg/m³
• Monthly averaged variation of micro tops II derived total ozone content & TOMS derived during year from 2002 to 2009 over Udaipur
• Comparative average monthly behavior of Total Ozone Content (TOC) derived from TOMS along with meridional wind velocity (U-wind(m/sec)), (V-wind(m/sec)), Air Temperature at 30 mb & Al 300 nm during period from Jan., 2002 to Dec., 2009 over Udaipur.
Climate Research Laboratory has been established in collaboration with (i) (Indian Institute of Tropical Meteorology – New Delhi Unit (IITM-DU) and (ii) Aryabhatta Research Institute for Observational Sciences (ARIES), Nainital.

Figure: Climate Research Laboratory (CRL) at AUH, Panchgaon

Vision and Mission

* Academic Curriculum for UG and PG Students (Besides the on-going Open Elective courses, a 2-year M. Tech. in Atmospheric Technology and Climate Management (ATCM) is being introduced very soon)
* Advanced Climate Research Laboratory (CRL) established
* Physicochemical and Transport Characteristics of Aerosols
* Radioactive and Hydrological Aspects of Anthropogenic Aerosols
* Regional Air Quality Diagnostics and Associated Human Health Effects

Recent and On-going Studies

* Organized a National Workshop on “Role of Aerosols in Air Quality, Weather and Climate” at AUH on 08 January 2015.
* Black Carbon and Particulate Matter Characterization during Diwali 2015 Festival Episode
* Road-Space-Rationing (Odd-Even) Scheme of Delhi Government – 1st phase (01 - 15 January 2016)
* Road-Rationing Scheme of Delhi Government – 2nd Phase (15 – 30 April 2016)
Department of Science and Technology

- Mobile phone and tower exposure measurement and biological correlations
- Duration: 2.5 Years
Total Cost: Rs. 5453400/-
Completed Projects
Ministry of Environment and Forests

• Analysis of surface and groundwater contamination through indiscriminate use of Agrochemicals (pesticides) use in the region of crops of maximum pesticide usage (Rice, cotton and vegetables)

Duration: 3 Years
Sanctioned Fund: 36,86,408/-

<table>
<thead>
<tr>
<th>Crops</th>
<th>Surfacewater</th>
<th>Groundwater</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetables</td>
<td>Yamuna River</td>
<td>Yamuna Khaddar</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(8 farm tubewells)</td>
</tr>
<tr>
<td>Rice</td>
<td>Hindon River</td>
<td>Badoli Banger</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(8 farm tubewells)</td>
</tr>
<tr>
<td>Cotton</td>
<td>Ghaggar</td>
<td>Punjuwan</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(8 farm tubewells)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pesticides</th>
<th>Groundwater</th>
<th>Surfacewater</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vegetable</td>
<td>Rice</td>
</tr>
<tr>
<td>Organochlorine Pesticide (α-HCH, β-HCH, γ-HCH, δ-HCH, Endosulfan-I, Endosulfan-II, Endosulfan sulfate, Dicofol, p, p’DDE and p,p’ DDT )</td>
<td>31.3%</td>
<td>24%</td>
</tr>
<tr>
<td>Organophosphate Pesticide (Phorate, Dimethoate, Phosphamedion, Methyl Parathion, Malathion, Chlorpyriphos, Quinalaphos, Profenophos and Ethion</td>
<td>19.4%</td>
<td>23.4%</td>
</tr>
<tr>
<td>Synthetic (Beta cyfluthrin, fenpropathrin, iemda cymalothrin, Alpha cypermethrin, deltamethrin, fenvelerate)</td>
<td>BDL</td>
<td>20.8%</td>
</tr>
</tbody>
</table>
Air pollution due to open drains

- The numerous open drains are a perennial irritant because of the stink and noxious gases they emanate, long term exposure to which can lead to serious health issues among those living in the vicinity.
- Inhaling gases like **sulphur dioxide, nitrous oxide and carbon monoxide** can lead to problems of breathlessness, suffocation, headache and abdominal disorders. Cases of allergy and skin problems are also on the rise among those residing along open drains.
- The open drains are a huge threat to the groundwater as well, with it’s stagnant and polluted water often getting mixed with potable water, resulting in exposure to a host of waterborne diseases.
- Apart from the environmental damage, gases emitted by the drains corrode pipes in air-conditioners, refrigerators and television, making gas leaks a frequent problem.
Ministry of Earth Sciences
Impact of Drains in Delhi on groundwater

- The project work was planned specially keeping in view the problem of groundwater contamination in Indian context through unlined drains which are over loaded, with sewage waste from huge urban population and also waste from industries. Lysimetric studies are important to know the possible sources and types of groundwater contamination through leaching.

- Duration: 3 Years
Sanctioned Fund: Rs. 56,31,900/-
Heavy metals detected

**Lead (mg/l)**
- OD S: 3.8
- OC L: 0
- OD L: 0
- WHO limit: 16

**Cadmium (mg/l)**
- OD S: 1.5
- OC L: 0
- OD L: 0.1
- WHO limit: 2.7

**Arsenic (mg/l)**
- OD S: 0.80
- OC L: 0
- OD L: 0.01
- WHO limit: 1.24

**Mercury (mg/l)**
- OD S: 0
- OC L: 0
- OD L: 0.0001
- WHO limit: 0.3

**Nickel (mg/l)**
- OD S: 0
- OC L: 0
- OD L: 0.1
- WHO limit: 0.5

**Cyanide (mg/l)**
- SD S: 0.05
- KD S: 0.5
- MG D S: 0.22
- MB D S: 0.1
- WHO limit: 0.5

**Total chromium (mg/l)**
- SD S: 0
- KD S: 0
- MG D S: 0.005
- MB D S: 0.0001
- WHO limit: 0.1

**Heavy metals detected**
Department of Science and Technology

Groundwater contamination through Chlorpyrifos leaching

Pest controllers in buildings for termite control 1 L/M² of 20% EC formulation

- Farmers and pest controllers use higher dosages of Chlorpyrifos out of their ignorance or due to adulterated pesticide available
- Duration: 3 Years

**Sanctioned Fund: Rs. 37,97,000/-**

<table>
<thead>
<tr>
<th>Days after treatment</th>
<th>Neutral Soil</th>
<th>Alkali Soil</th>
<th>Acidic Soil</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Single dose treatment</td>
<td>Double dose treatment</td>
<td>Single dose treatment</td>
</tr>
<tr>
<td>30</td>
<td>9.78±0.98</td>
<td>12.43±1.21</td>
<td>8.59±0.89</td>
</tr>
<tr>
<td>60</td>
<td>7.19±0.74</td>
<td>9.54±0.87</td>
<td>6.72±0.63</td>
</tr>
<tr>
<td>90</td>
<td>5.67±0.62</td>
<td>7.78±0.57</td>
<td>6.11±0.68</td>
</tr>
<tr>
<td>120</td>
<td>4.29±0.92</td>
<td>5.84±0.72</td>
<td>4.23±0.44</td>
</tr>
<tr>
<td>150</td>
<td>4.03±0.54</td>
<td>7.02±0.97</td>
<td>3.56±0.97</td>
</tr>
<tr>
<td>180</td>
<td>3.77±0.73</td>
<td>5.24±0.85</td>
<td>3.13±1.13</td>
</tr>
<tr>
<td>360</td>
<td>3.01±0.56</td>
<td>4.37±1.02</td>
<td>2.97±1.08</td>
</tr>
<tr>
<td>Total (%)</td>
<td>37.74</td>
<td>85.16</td>
<td>51.52</td>
</tr>
</tbody>
</table>
Department of Science and Technology

- Development of a cost effective lysimeter and method for leaching studies to estimate risk assessment of groundwater contamination
- Duration: 3 Years

Total Cost: Rs. 3415280/-
Department of Science and Technology

- “Leaching Behavior Of Currently Used Pesticides In Different Types Of Soil” has received “New investigator Award” at American Chemical Society meeting, 17-21 August, 08
Patents

- Jindal, Tanu. 2016. An exposure system for dosimetric application of microwaves to small insects, Provisional draft of CRN 1948, Filed July 22, 2016


"PARADIGMS IN POLLUTION PREVENTION"

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Awards and Honors

- Fellow of National Environmental Science Academy (NESA) 2018
- Environmental Education Award-2018 by Global Nature Film Festival
- Editor of The Year Award 2017 by MTRES
- Excellence in Research and Teaching Award 2017 by National Environmental Science Academy (NESA)
- Scientist of the Year Award-2015 by National Environmental Sciences Academy (NESA)
- Environmentalist of the Year Award-2014 by National Environmental Sciences Academy (NESA)
- Young Scientist Project from Department of Science and Technology (DST), New Delhi 2004-2007
- NFP Fellowship of one month duration from Netherland for IPM and food safety course, 2007
- Junior Research Fellowship 1996-98 and Senior Research Fellowship 1998-99 from UGC through Graduate Aptitude Test for Engineering (GATE)
- Best paper presentation award in “Environment - III” Symposium 10 - 12 December 1996, held at National Chemical Laboratory, Pune
Training Courses

• One day workshop on “Air Pollution Monitoring: Next Generation Instrumentations and Techniques”, May 04, 2016, Civil Engineering Department, IIT Delhi, India
• International Workshop for Research on the possible impact of EMF radiation exposure from mobile towers and handsets, April 8-9, 2016, IIT Delhi, India
• “Integrative Science and Interdisciplinary Engineering”, June 5, 2015, Amity University, Haryana
• Workshop on “Research opportunities in Hydrology and water resources under climate change”, IIT Guwahati, April 3, 2015
• “Issues involved in man-animal conflict-strategies for mitigation” organized by Amity Institute of Wildlife Sciences, January 16-17, 2015, Amity University, Noida
• Training programme on “Monitoring of PM$_{2.5}$ and other notified air pollutants as per revised NAAQS”, January 19-23, 2015 organized by CSIR-NEERI, Delhi
• International workshop on “Green Initiatives in Energy, Environment and Health”, December 2-3, 2013, Hotel Maidens, Delhi
• Preclinical GLP Study Director’s Workshop, Veterinary College, Bangalore, 8-10 October, 2012
World Environment Day-2019
“Conserving Green Earth and Blue Oceans for Sustainability”
June 4, 2019
World Water Day-2019
“Fresh water and Sustainable development-leaving no one behind”
March 19, 2019
International workshop on Environment, Climate Change and Impact on Human Health September 24-25, 2018
World Environment Day-2018
at
Vigyan Bhawan, New Delhi
June 1-5, 2018
Meeting with Kent University Delegates with Dr. Atul Chauhan
On Belongingness Day Celebration 2018
14 May, 2018
World Earth Day 2018
“SAVE EARTH, TO BRING WORTH, FOR THE NEW BIRTH"
April 20, 2018
World Water Day 2018

“Nature for Water”-Exploring Nature Based Solutions to the Water Challenges

In association with
Central Water Commission

March 22, 2018
4th Conference
Science and Geopolitics of Himalaya-Arctic- Antarctic (SaGAA IV), November 30 – December 1st, 2017
AIR POLLUTION MITIGATION STRATEGY BY AWARENESS CAMPAIGN; EXHIBITION; RADIO PROGRAM AND WORKSHOP FOR “SAY NO TO CRACKERS”
WORLD OZONE DAY & WORLD ENVIRONMENT HEALTH DAY 2017
September 25th, 2017
World Environment Day 2017
Air Pollution Sources and Mitigation strategies
May 15, 2017
World Water Day 2017
“EMBRACE THE WATER, SUSTAINABLE SOLUTIONS FOR THE FUTURE”
March 21, 2017
Training Programme
On
Fire Safety
Workshop
Air, Water and Soil: Pollution Prevention Paradigm-2016
In association with
Southern Federal University, Russia
International Conference
New Insights & Multidisciplinary Approaches in Toxicological Studies”
36th Annual Conference of Society of Toxicology (India) 2016
3rd International IUPAC Conference
Agrochemicals protecting crops, health and natural environment
– New Chemistries for Phytomedicines and Crop Protection Chemicals April 6-9th, 2016
National Water Summit, March 22, 2016 - PHD CHAMBER
Water, Sanitation and Hygiene (WASH)
ASSOCHAM, December 2, 2015
International Conference
Science and Geopolitics of Arctic and Antarctic Regions
(SaGAA III), September 29-30, 2015
World Environment Day - 2015
Earth Day - 2015
World Water Day - 2015
World Ozone Day-2014
National Conference
Earth and Environment: Pollution and Prevention
Ministry of Earth Science, January 28-30, 2014

Preserving the planet

With the presentation of 88 papers and 9 lectures, the national conference on environment initiated discussions on pertinent issues affecting our earth.

A national conference on the pressing problem of environment pollution, was organised by Amity Institute of Environmental Toxicology, Safety and Management (AIETSM) in association with Ministry of Earth Sciences. Convenor of the conference, Prof. Tushar Jindal, director, AIETSM, highlighted the theme of the conference as land use and soil health, ocean and water resources and air quality, atmosphere and climate change.

The conference was inaugurated by a galaxy of experts including Dr. John Dunham, deputy chief, environment, science and technology affairs, US Embassy; Dr. Vinod Babu, incharge, Hazardous Waste Management Division, CPCB; Dr. RK Khadak, VC, UP Tech University; Dr. Sanjay Bajpai, director/scientist ‘F’, Technology Mission Cell, Water & Solar Energy, DST. Dr. Ashok K. Chauhan, Founder President, Amity Universe, conveyed his best wishes for the success of the conference and wished all the participants good luck.

A total of 88 papers and 9 lectures were presented during the conference, which served as a platform to sensitise the masses about the grave implications of environmental deterioration. Among the eminent guests who delivered talks were Prof RK Singh, CSIR, Lucknow; Prof. Neera Kapoor, IGNOU, New Delhi; Dr. RS Antil, HAU, Hisar; Dr. Ch. Roshneesh Gosh, DU; Dr. J Behari, professor (retd), Jawaharlal Nehru University; Dr. RB Lal, deputy director, Impact Assessment Division, Ministry of Environment and Forests and Prof. Rakesh Ravindra, Earth System Science Organisation, Ministry of Earth Sciences, New Delhi.
National Conference
Environmental Pollution, Soil Health and Sustainable Agriculture,
Indian Network for Soil Contamination Research and Delhi University,
January 15-17, 2013
National Workshop
Pollution Prevention Paradigm
Ministry of Earth Sciences, May 11, 2012

National Workshop on Pollution Prevention Paradigm was a step by Amity University towards building a greener and safer world.
Workshop
Use Bicycles for Healthy Youth and Green Environment
Ministry of Environment and Forests, March 12, 2010

In an Awareness Campaign for Students and Youth, Amity Institute of Environment Toxicology Safety and Management organized a workshop on promoting the use of bicycle as a modest means of transport.

The Indian Environment Society (IES) under National Environment Awareness Campaign (NEAC) and the Ministry of Environment and Forests (MOEF) lent all the support possible to the program.

Dr. Tarun Jindal, Director, Amity Institute of Environment Toxicology Safety and Management urged students to bicycle as cycling not only conserves energy but is also a great exercise that promotes good health. Besides, it is cost effective because it requires less maintenance and uses up no fuel. Cycling can also prove effective in dealing with the environmental threat of Global Warming as it emits no toxic gases. Moreover, cycling causes no sound pollution. Just like developed countries like USA, Japan, Australia have, India must go the bicycle way too. So, what you waiting for? Pick up that bicycle from the garage save the world while refreshing your childhood memories!
**Nurture Indoor Plants**

**Enriching Oxygen Purifying Air**

**“Lungs of Home”**

**Campaign For Awareness – Lungs of Home**

**“Nurture Indoor Plants - Enrich Oxygen and Purify Air Providing Lungs to Home”**

Be a part of our campaign on growing indoor air purifying and oxygen releasing plants providing lungs to your home. Please promote the use of indoor plants for better health. Let us take a pledge to make **200 lungs** by contacting **50 people** in a week and make them nurture at least **4 indoor plants** each.

**Air purifying indoor plants:** Areca Palm, Sansevieria trifasciata, Golden Pothos, Chrysanthemum and Money Plant.

**Oxygen releasing indoor plants at night:** Spider Plant, Snake Plant, Peace Lily, Pothos, Weeping Fig, Philodendron, Aloe Vera and Chrysanthemum.

---

**Campaign**

**"Say No To Fire Crackers"**

Wishing You a Very Happy & Prosperous Diwali

**Adverse Health Impact of Chemicals from Fire Crackers**

<table>
<thead>
<tr>
<th>Compound</th>
<th>Colour</th>
<th>Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potassium Nitrate</td>
<td>Violet</td>
<td>Toxic carcinogenic effects</td>
</tr>
<tr>
<td>Barium Nitrate</td>
<td>Green</td>
<td>Poisonous, irritation of respiratory tract</td>
</tr>
<tr>
<td>Lithium Compounds</td>
<td>Red</td>
<td>Toxic and causes irritation</td>
</tr>
<tr>
<td>Mercury (Mercurous chloride)</td>
<td>Silvery white</td>
<td>Toxic and bio-accumulates</td>
</tr>
<tr>
<td>Arsenic Compounds</td>
<td>Grey</td>
<td>Toxic ash can cause lung cancer, skin irritation, wart formation</td>
</tr>
<tr>
<td>Strontium Compounds</td>
<td>Red</td>
<td>Toxic can replace calcium in body</td>
</tr>
<tr>
<td>PM2.5 PM10</td>
<td>Grey to black</td>
<td>Accumulates in body, carcinogenic aggravates respiratory illness, Asthma</td>
</tr>
<tr>
<td>NO₂</td>
<td>Colourless</td>
<td>Irritation to the skin, eyes and throat, coughing and asthma</td>
</tr>
<tr>
<td>SO₂</td>
<td>Colourless</td>
<td>Lung disorders and shortness of breath</td>
</tr>
</tbody>
</table>
Convocation
"Save earth to bring worth for the new birth"

THANK YOU