Editorial

Need for holistic and sustainable measures for Crop residue management

Dear Readers,

Paddy stubble burning is used as a quick and labor-saving field preparation measure for sowing wheat in the Rabi season. The 20-day window available for sowing wheat is not sufficient for the in-situ decomposition of the straw and therefore, stubble burning has emerged as a quick and economical solution. However, there is a need to identify effective and replicable alternative practices to stubble burning that not only are directed towards air quality improvement but address the farmer’s principal concern, which is economic. The new alternative must be a combination of solutions addressing the farmer’s concerns of the time, economic benefit, and operational feasibility and must provide a superior value proposition to stubble burning. The new alternative must be timewise more efficient and crop-wise more productive than stubble burning. We are pleased to bring to you a special article in the upcoming special edition of the CÉRCA Newsletter on how corporates like ITC Limited are leading a successful Crop residue management initiative at Kapurthala through a process of experiential learning by responding to farmer’s perceptions and rationale for burning stubble, prioritizing the best technology in terms of operational effectiveness and access and preparing a proper communications strategy for farmer engagement.

Happy reading!

Yours sincerely

Hemant Kaushal
Pr coordinator
Delhi has the highest pollution levels

The graph above shows the daily average PM$_{2.5}$ for the month of November 2022. Amongst the major metros worldwide, Delhi has shown the highest concentration of PM$_{2.5}$ followed by Kolkata and Dhaka. Delhi and Kolkata, within India, rank among the topmost polluted cities worldwide.

Delhi PM$_{2.5}$ (24 hr. daily average) Trend
November 2021 Vs 2022

Air quality in Delhi improved slightly in November 2022 compared to November 2021. Factors contributing to improved air quality include a decrease in the proportion of stubble burning in Delhi's pollution. This November, the number of active fires in Punjab and Haryana were the second lowest since 2016. Furthermore, due to moderately favorable meteorological conditions, the wind direction alternated between westerly and south-westerly, reducing the share of pollutants from stubble burning to Delhi. According to India Meteorological Department (IMD) data, Delhi also had its warmest November in six years, with an average maximum temperature of 28.8 degrees Celsius. This most likely prevented pollutants from accumulating near the ground. Hence, PM$_{2.5}$ was decreased by 60.91 µg/m$^3$ on average in November 2022 as compared to November 2021.
Expert Talk delivered by Dr. Valentin Foltescu on 30th November 2022

On November 30th, 2022, Dr. Valentin Foltescu delivered a talk on "Role of Science in Designing Effective Clean Air Policies". He spoke about the need for an airshed approach for better air quality management. He further addressed the need for researchers, industry leaders, decision-makers, and political leaders to work together to strengthen and expand cooperation at all scales on transboundary air pollution. He stressed on strengthening and integrating policies, and the capacity of institutions in all countries to develop the knowledge, tools, ground-based observations, and data to implement effective policies to reduce air pollution.

If you have missed this event, the link below will direct you to the recorded video.

[Watch the complete Expert Talk Series Here.]

Industry Roundtable on Environmental Challenges and Technology Adoption on 22nd November 2022

DRIV and CERCA IIT-Delhi conducted the Industry Roundtable on Environmental Challenges and Technology Adoption under the project SAMEER. Prof. Sagnik Dey from IIT Delhi presented his views on air quality components and source apportionment (PM2.5, PM10). Participating Indian startups (Airveda, Airth, Swachh.io, Cleanos LLC, Umeandus Technologies, Omnion) showcased their technologies for better air quality management. A panel discussion on Air Pollution Mitigation Initiatives & Technology Adoption: an industrial perspective was moderated by Mr. Vijay Rai, Chairman of CII, India. The event saw participation from different industry partners that came together to make this event a documentable success.

Sustainable Air Quality Workshop on "Towards Enhancing Understanding of the Educators on Air Pollution and Mitigation Measures" on 7th & 8th November 2022

This workshop is part of project SAMEER (Solutions for Air-pollution Mitigation through Engagement, Engineering, and Research). This initiative is being led by DRIV, Delhi Research Implementation and Innovation (an initiative of the Principal Scientific Adviser to the Government of India), and Arun Duggal Center of Excellence for Research in Climate change and Air Pollution (CERCA). The workshop is being conducted by DEEP-C (Delhi Effective Education Pedagogy Cluster), the Effective Education vertical of DRIV.

"Sustainable Air Quality" Workshop is the second workshop in this series for teachers of 7-12 grade students in order to gain a better understanding of air quality and related issues. Educators teaching grades 7-12 were invited to participate in the workshop, in order to have hands-on activities to provide insight into air quality and group discussions on air pollution's health effects. Also, interactive sessions were conducted to build lesson plans to contribute to and enhance educators' classroom preparation. It was planned to include gamification and other innovative pedagogical tools for the effective integration of...
sustainability education into the mainstream curriculum.

A key motivation for this initiative is

- To connect educators with air quality experts, technology partners, regulators, and scientists. Consequently, they will benefit by
- Establishing a network of their own for information and awareness pertaining to air quality to build inclusive resources accessible to all
- Developing creative lesson plans for the curriculum mapped to topics to meet teaching requirements
- Gaining skills in gamification and carbon footprint calculators to cater to different learning styles and learning needs
- Learning about sustainable solutions to control air pollution & assessing the implementation strategies towards reduction in air pollution.

Venue: IIT Delhi, 7-8th November, 2022

The Air Quality Action Forum (AQAF) was launched by UNEP with assistance from the Paytm Foundation with the aim of improving collaboration within the national community concerned with air quality. Along with the Centre of Excellence for Research in Climate Change and Air Pollution (CERCA) at IIT-Delhi, UNEP has successfully conducted ten consultations with 100+ organizations under the aegis of the Air Quality Action Forum (AQAF).

Aligned with the Government of India’s vision of addressing air quality, UNEP will share the findings from the needs assessment and discuss the modality of the resource center underpinning AQAF to support the government in the implementation of the National Clean Air Programme (NCAP).

Moving forward towards achieving key milestones under the AQAF initiative, the Forum Convention is being organized (in hybrid mode) in the presence of the Honorable Minister of Environment Shri Bhupendra Yadav. All the valuable suggestions & inputs gathered from all consultations on challenges, gaps, needs, and possible solutions, have been compiled into a report, which will be brought out at the Forum Convention and scheduled to take place on 13th, December 2022. The event shall underscore the identified opportunities for strengthening air quality management in India.

‘Green firecrackers’ with reduced barium emissions in particulate matter

Utkarsha Wankhede, V.V.Khaparde, Krutika Balpande, V.M.Shinde, Sadhana Rayalu

- Traditionally in all firecrackers, barium (Ba) compounds are used as oxidizers and also to impart green color flame.
- CSIR NEERI has developed reduced-emission firecrackers (green crackers) with reduced PM & Ba emissions. They used multifunctional additives of iron oxide and zeolite to reduce emissions.
- They tested inside a firecracker emission testing facility to check the levels of barium in PM10 and PM2.5.
PM and Ba emission reduction were observed by 30–60% and residue analysis revealed the formation of heavy-density particles.

**Exposure Contrasts of Pregnant Women during the Household Air Pollution Intervention Network Randomized Controlled Trial**

Michael Johnson et al

- This study reports exposure reductions achieved by a liquefied petroleum gas (LPG) stove and fuel intervention for pregnant mothers in the Household Air Pollution Intervention Network (HAPIN) randomized controlled trial.
- The HAPIN trial included 3,195 households primarily using biomass for cooking in Guatemala, India, Peru, and Rwanda.
- Twenty-four-hour exposures to PM2.5, carbon monoxide (CO), and black carbon (BC) were measured for pregnant women.
- Exposure reductions were consistent over time and were similar across research locations.
- This study indicates that an LPG intervention can reduce PM2.5 exposures to levels at or below WHO targets.

**Residential greenness and air pollution concerning excessive gestational weight gain during pregnancy: A cross-sectional study in Wuhan, China**

Miyuan Wang, Chen Wen, Haiqin Qi, Ke Xu, Mengna Wei, Wenqi Xia, Lan Lv, Zhengrong Duan, Jianduan Zhang

- Gestational weight gain (GWG) is an important indicator of pregnant women and fetuses' health and nutrition status.
- This study aims to explore the association of residential greenness with EGWG, consider the mediating effect of air pollution, and estimate the combined impact of residential greenness and air pollution exposures on EGWG.
- Two spectral indexes, the normalized difference vegetation index (NDVI) and soil-adjusted vegetation index (SAVI), were used to proxy residential greenness.
- The air pollution data included six indicators (PM2.5, PM10, SO2, CO, NO2, O3) and used the Ordinary Kriging interpolation method to estimate overall pregnancy exposure to air pollutants.
- Generalized linear mixed regression models were utilized to explore the relationship between residential greenness and EGWG.
- A decreased risk of excessive gestational weight gain (EGWG) was associated with a higher level of residential greenness.

**News Wrap-up**

**Stubble burning counts in Punjab and Haryana lowest since 2020**

Both Punjab and Haryana have recorded the lowest paddy residue burning events this year since 2020, shows data from the...
Indian Agricultural Research Institute (IARI), which follows the standard protocol notified by the Commission for Air Quality Management in National Capital Region and Adjoining Areas (CAQM) in 2021. Between September 15 and November 23, Punjab and Haryana witnessed a reduction of fire counts by 30% and 48%, respectively, this year as against last year. The impact of stubble burning in Delhi’s air was less than last year, shows the data of the System of Air Quality and Weather Forecasting And Research (SAFAR), the forecasting body under the Union ministry of earth sciences.

List of Most Polluted Indian Cities Released by CPCB

The data shows that Delhi’s AQI stood at 354, Noida’s stood at 328 and Ghaziabad’s stood at 304. The air pollution levels in India worsened in 2022. As per data released by the Central Pollution Control Board, Katihar in Bihar had the highest AQI (Air Quality Index) of 360 among 163 Indian cities on November 7. Transport-level winds blow in the lowest two layers of the atmosphere -- troposphere and stratosphere -- and carry smoke from farm fires to the National Capital Region.

Premature deaths due to air pollution exceed 238M: EEA Report

Premature death is becoming a grave problem of this century as lifespans are reduced by ever-growing environmental pollution. At least 238,000 people in the European Union died younger than expected in 2020 due to exposure to airborne pollutants despite an improvement in air quality,

Air pollution damage to the lungs is irreversible

The adverse health impact of air pollution is an immediate public health concern in the country and the government should look to address the concern in the most effective manner. The issue of air pollution has not been redressed impact fully and the resultant damage is a threat to our lungs - an organ that processes life with every breath that we inhale. Hence healthy lungs are a non-negotiable aspect of a healthy body and non-toxic and safe air plays a key role in ensuring strong and healthy lungs.

65% of insects on Earth to go extinct due to climate change

While humans suffer from intense damage due to climate catastrophes, a new study indicates that a majority of the insect population will go extinct under the influence of changing climate. Researchers found that 65 percent of the insect population on the planet could go extinct over the next century. The details of the study have been published in the...
According to new data released by the European Environment Agency (EEA), analysis showed that air pollution is "the largest environmental health risk in Europe" and significantly impacts the health of the European population, particularly in urban areas, despite declining emissions of all key air pollutants in the EU.

A study published in the journal Nature Climate Change, which states that climate-mediated changes in thermal stress can destabilize animal populations and promote extinction risk and that the effects of climate change may be more extensive than previously predicted.