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CSIR-NGRI

15th November, 2023

CSIR-NGRI Chief Scientist Dr D. Srinivasa Sarma gets the Sitaram Rungta Memorial Award 2023

DECCAN NEWS SERVICE

■ HYDERABAD

Dr. Drona Srinivasa Sarma, Chief Scientist at the city-based CSIR-National Geophysical Research Institute, Hyderabad, has been awarded the prestigious Sitaram Rungta Memorial Award for the year 2023 by the Society of Geoscientists and Allied Technologies (SGAT), Bhubaneswar for his significant contribution in the field of Mineral exploration and gold metallogenesis. Dr. Sarma obtained his Doctorate in Geochemistry and Genesis of Gold Mineralization from Osmania University in 2003. His primary research focuses on gold deposits like those at Hutti and

Gadag, provided the first age constraints on the gold deposits, and studied the genetic aspects of gold mineralization in India and Madagascar. Dr. Sarma was the first to provide age constraints on the Indian gold deposits. He has contributed to the development of Pb-Pb baddeleyite dating (for mafic-ultramafic rocks) protocols using TE-TIMS which can give ages as precise as ± 1 Ma and helped to constrain the oldest mafic dyke emplacement events (~ 2.8 Ga) from the Singhbhum craton of India. These research results have been published in internationally reputed Journals. Dr. Sarma has been a post-doctoral research fellow at the University of Western Aus-



tralia and worked under the prestigious Raman Research Fellowship at the University of Alberta, Canada. He is also a fellow of the Telangana Academy of Sciences and received the prestigious National Geoscience Award in 2022

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CSIR-NEERI

15th November, 2023



CSIR-NEERI ने मनाया 8वां राष्ट्रीय आयुर्वेद दिवस

■ नागपुर, व्यापार प्रतिनिधि. सीएसआईआर-नीरी में क्षेत्रीय आयुर्वेद अनुसंधान संस्थान (आरएआरआई) के सहयोग से 8वां राष्ट्रीय आयुर्वेद दिवस मनाया गया. इसका उद्देश्य न केवल मानव बल्कि पौधों आदि सहित पर्यावरण के हित में आयुर्वेद की क्षमता को संबोधित करना था. इस अवसर पर नीरी अस्पताल परिसर में आयुर्वेदिक महत्व के पौधों और पेड़ों की प्रदर्शनी का आयोजन किया

गया, जिसका उद्घाटन नीरी के निदेशक डॉ. अतुल वैद्य ने किया. आरएआरआई के सहायक निदेशक डॉ. मिलिंद सूर्यवंशी ने आयुर्वेद के महत्व, गतिविधियों और आरएआरआई द्वारा प्रदान की जा रही सुविधाओं के बारे में जानकारी दी. डॉ. शेखर नंबूरी ने भी मार्गदर्शन किया. डॉ. प्रिया ठाकरे ने ऑनलाईन निबंध प्रतियोगिता के विजेताओं को पुरस्कार दिए. संचालन शिल्पा परांजपे ने किया.

Covid fight not over for data crunching Neeri scientists

Daily All-India Count Of New Cases Still On

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Nagpur: When was the last time you cared to check the daily Covid count? No one today follows the Covid numbers, which once raged in social media groups. But for scientists at National Environmental Engineering Research Institute (Neeri), the numbers still hold as much importance as they did during the initial days and peaks of the Covid pandemic.

Senior principal scientist Dr Ritesh Vijay and his two senior research fellows, Hanisha Mamidiseti and Chaitanya Thakre, continue to track the pan-India Covid scenario on a daily basis even today, though Covid is barely visible, and most data keepers, including the health department, have stopped releasing daily figures. "We shall continue till no new case is reported from anywhere in the country," said Dr Vijay.

The scientists collate the complex data from ministry of family health and welfare (MoFHW) and put it in graphical form to make it simpler to understand.

STILL TRACKING THE PANDEMIC

▶ As Covid cases decline, even health departments have stopped releasing daily figures

▶ A Neeri team, headed by senior principal scientist Dr Ritesh Vijay, continue to track the pan-India Covid scenario on a daily basis

▶ The team collates complex data from

MoFHW & converts it into a simpler, easy to understand form

▶ The data is plotted on a India map, with green indicating Covid-free status and bars in red showing new cases

“We will continue till no new case is reported across the country”
DR RITESH VIJAY
SENIOR PRINCIPAL SCIENTIST, NEERI

A glance at the graphic instantly reveals there are 155 active cases in nine states, while 22 states are Covid-free as on Tuesday. The data is plotted on a map of India, with green indicating Covid-free status and bars in red showing new cases, tests, recoveries and deaths, if any.

The team had also helped Nagpur Municipal Corporation (NMC) keep track of containment zones through Google maps graphically, thus sparing the trouble of going through several sheets.

What makes their endeavour all the more special is that they belong to waste water technology department of Neeri, which primarily doesn't deal with information processing. It was Neeri's environment virology cell led by Dr Krishna Khairnar that spearheaded the Covid fight with whole genome sequen-

cing (WGS) and their innovative saline gargle tests.

Dr Atul Vaidya, director Neeri, said Dr Khairnar and his team worked round the clock as no one had diagnostic tools like Neeri had in the initial days of Covid in 2020. "The cell did outstanding work and responded to the call of the nation. WGS is still going on," he said.

Dr Vaidya said it is commendable Dr Vijay and his team continue to publish the Covid figures. "This is basically an information technology domain task. R&D in waste water was shut during lockdown, so Dr Vijay utilized his time and knowledge for this purpose," he said.

Dr Vijay said, "We started in April 2020. As scientists, we were curious and also had to utilize our time and resources. This is a completely voluntary exercise."

Delhi: A chamber to light up old tulip bulbs

CSIR-IHBT

15th November , 2023

The New Delhi Municipal Council (NDMC) has established its first chamber for tulip growth and storage at the Lodhi Gardens, successfully propagating and cultivating the flowers from used bulbs. The centre, established in April this year, is the first of its kind in India, according to officials. Here, tulip bulbs are cultured in a controlled environment using relative humidity, minimum temperature (2-20 degrees Celsius), appropriate light and zero exposure to ethylene.



NDMC plans to use biochemical sprays on the bulbs to enhance productivity and flower size. While the propagation chamber has the capacity to grow about 2,000 tulip bulbs, the cold storage chamber can store up to 50,000 bulbs. NDMC is looking to boost the propagation chamber's capacity to 4,000 bulbs with a controlled temperature of 10-22 degrees Celsius.

"Of the 54,000 bulbs harvested from NDMC areas after tulip blooming in February-March, 52,000 bulbs were sent to CSIR-IHBT, Palampur while 2,000 bulbs 8-10cm in size were kept in the storage chamber for three months followed by other procedures. To understand the process for preservation and culture, we pursued the scientists at Sher-e-Kashmir University of Agricultural Sciences and Technology, which helped a lot," said an official.

Thereafter, the bulbs were kept in low temperatures - 5-6 degrees Celsius - for 10 weeks at the storage house. In October first week, they were put in the production chain and sown in a growth chamber at 17-20 degrees Celsius, with the aim to increase their size to more than 10cm.

The experiment showed encouraging results with early foliage growth and 70% of the bulbs began blooming from November 1, the official said. "The initiative, if implemented on a large scale, could reduce import costs and ensure indigenous seeding and production in the future. It will also boost the local floriculture industry in Delhi," he added.

Last winter, lieutenant governor VK Saxena, during his visits to tulip plantations in NDMC areas, had stressed on exploring ways to augment their availability in the city.

"Based on his suggestions and after brainstorming by LG Secretariat, CSIR, DDA, NDMC and MCD officials, it was decided to initiate research and trials for multiplication and production of tulip bulbs in India. We then established the chamber in April," said the official. The unit is a fabricated structure where preservation and propagation of harvested bulbs, including tulip and lilies, started on a trial basis. "The reason for selecting Lodhi Garden was availability of trained staff and uninterrupted power supply. We may supervise it through a control and command centre later," said the official.

This year, NDMC ordered three lakh tulips from Holland - two-thirds to be planted in Lutyens' Delhi and the remaining third in DDA areas. Each bulb costs NDMC Rs 26.

"The bulbs will be imported by the beginning of December and we expect to start planting them by the year end during extreme cold weather. The bulbs will start blooming in multiple shades in January," said the official.

Mining ministry invites projects in critical metals, rare earths from universities, HEIs

CSIR

14th November , 2023

The ministry of mining has invited projects having direct bearing on mineral and mining sector from students, scientists and researchers at academic institutions, universities, and Research and development institutions. The projects will be accepted for three years by the ministry. The institutes should be recognised by the department of scientific and industrial research. Project proposals are to be submitted online on the Satyabhama portal, research.mines.gov.in, by December 4.



The applicants will also have to send a soft copy of the project proposal generated from the Portal in PDF format needs to be sent to the e-mail: met4-mines@gov.in. The ministry has invited science projects in the field of critical metals such as gallium, niobium, nickel, lithium, tungsten, germanium, selenium and indium; rare earth; recycling and circular economy; energy efficiency; and new material and processes.

Guidelines for submitting proposals

The ministry of mining said the project proposal should have participation of micro, small and medium enterprise or an industry in the form of at least 20% financial contribution (between cash and kind contribution, at least 15% cash contribution). If a candidate is submitting the proposal in research and development category, then it should be in the technology readiness level (TRL) of 3 to 7 in the identified thrust areas, the ministry added.

The proposal should have also completed the sample collection and its first level characterisation. The institute should have analysis capability or prior tie-up with other

institute in this regard for the intended purpose, the ministry said. In case of a proposal submit by CSIR labs, co-funding from CSIR of at least 25% of the total project cost or total cost of capital equipment, which ever is higher is mandatory.

Lecture Organized On Microfossils As Earth's Thermometer

CSIR-NEERI

14th November , 2023

The Training and Placement Cell, Department of Geology, Aligarh Muslim University organized a lecture by an eminent scientist, Dr. Rajeev Saraswat, Senior Principal Scientist at the CSIR-National Institute of Oceanography (Goa), on “Microfossils as Earth's Thermometer”, under the G20-University connect programme.

Dr. Saraswat, who is also an alumnus of the Department, lucidly presented how the microfossils work as a useful proxy in deciphering climate change. He also highlighted its importance in understanding the climatic conditions tens of thousands years ago.

Prof. Rashid Umar, Chairman of the department welcomed the guest speaker, while Prof. M.E.A. Mondal, Training and Placement Officer (Geology) introduced the guest and conducted the programme.

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Modified lifestyle acts as first line of treatment for chronic disease, can be managed in 14 days: Study

CSIR

14th November , 2023

On the occasion of World Diabetes Day, a study by Indian researchers found that the chronic disease condition can be managed within 14 days with the help of ayurveda formulations like BGR-34, along with a balanced diet and a change in lifestyle, including a morning walk daily. The study, conducted by a team of researchers from Patna-based Government Ayurvedic College and Hospital on a patient suffering from high levels of blood sugar, has been published in the International Ayurvedic Medical Journal (IAMJ).

The team, led by Assistant Professor Prabhas Chandra Pathak, prescribed the patient a combination of research-based traditional medicines, including herbal formulations like BGR-34, Arogyavardhani Vati, Chandraprabhavati, cholesterol-reducing drugs, lifestyle adjustments and a specific diet for two weeks.

After 14 days, the treatment was slightly altered. During this time, the patient showed significant improvement; for instance, the sugar level, which was 254 mg/dl at the time of admission, came down to 124 mg/dl.

It was found that anti-diabetic herbal properties enriched in Daruharidra, Giloe, Vijaysar, Gudmar, Methi and Majishtha in the BGR-34 helped cut down the sugar level in the blood. This medicine has been prepared by the country's premier research institute, CSIR, after extensive research. Dr Sanchit Sharma, Executive Director of Aimil Pharmaceuticals, the manufacturer of BGR-34, pointed out that since diabetic patients have to depend on lifetime medicines, the outcome of the study holds significance.

"These herbal preparations also have elements to increase immunity as well as anti-oxidant levels," Sharma added. Researchers said that during the study, the patient was also recommended an hour's walk daily.

The patient's fasting sugar level, which was 254 mg/dl before the start of treatment, came down to 124 mg/dl. Similarly, the sugar level after breakfast decreased from 413 to 154 mg/dl. All these parameters indicate an effective reduction in blood sugar levels.

Encouraged by the positive results of the treatment plan, the researchers have suggested a comprehensive, larger study for its further assessment. In fact, earlier, a study by the AIIMS in Delhi found that BGR-34 is effective not only in reducing sugar but obesity as well.

World Diabetes Day is celebrated every year on November 14 across the country on the birthday of Frederick Banting, who, along with scientist Charles Best, discovered insulin in 1922.

According to studies, approximately 74 million people live with diabetes in India. With the rising rates of obesity, the prevalence of diabetes is also expected to rise further in India, doctors warn.

According to the World Health Organisation, diabetes is a major cause of blindness, kidney failure, heart attacks, strokes, and lower-limb amputations.

Notably, interactions between lifestyle and genetic factors cause the development and progression of a spectrum of chronic conditions, including obesity, type 2 diabetes mellitus, hypertension, cardiovascular disease and several types of cancer.

India gets ready with rare earth R&D push

CSIR

13th November , 2023

India is scaling up efforts to secure supplies of critical and rare earth minerals, with the mines ministry inviting research and development proposals for mining technology, including deep-sea and green mining, from academic institutions.

India's plan is to establish and support R&D projects, focussing on critical, rare earth and deep-seated minerals like lithium, nickel and tungsten over three years. The ministry seeks to develop sustainable solutions using technologies like robotics, Internet of Things, artificial intelligence and machine learning for exploration, prospecting, and mining of strategically important minerals found in challenging locations.

“Projects are invited from academic institutions, universities, national institutes and R&D institutions recognized by Department of Scientific and Industrial Research, for up to three years on the identified topics of directed R&D and in thrust areas which have direct bearing on the mineral sector, applied and sustainable aspect of mining and industrial applications,” a ministry note said.

The ministry proposes the establishment of R&D projects for mineral categories recently made accessible to private sector mining. The auction process for these mineral blocks is set to start soon. During the monsoon session, the government revised the mining legislation to remove various atomic and critical minerals, including lithium, from the restricted list, allowing the private sector to participate in the auction for mining.

Separate legislation was introduced to allow the private sector to participate in off-shore and deep-seated mining, including rare earth minerals critical for industrial use. “For several mineral categories, spanning critical, strategic, deep seated and rare earth, mining will be fine for the vert first time. The government’s R&D initiatives seek to employ the right

technologies so that mining can be undertaken in most efficient and sustainable manner," said a government official privy to the matter on condition of anonymity. The R&D initiative of the mines ministry is directed toward five broad heads—critical minerals, rare earth minerals, recycling and circular economy, energy efficiency, and new material and processes. The critical mineral project include development and establishment of technologies for recovery of nickel and lithium from scrap battery, recovery of lithium from new deposits including development of process flow sheets for the mineral beneficiation for new finds.

Projects have also been invited from institutions for development of a low-cost automated system able to separate aluminium alloys using laser-induced plasma to analyze the composition of materials for rapid and accurate sorting and identification of metals in complex mixtures. Use of artificial intelligence and machine learning will also be an area for research where specific projects would establish technologies for metal scrap sorting, based on colour and shape, which utilize advanced imaging and computer vision techniques to identify and classify metal scraps.

In the category Internet of Things (IoT) and sensor-based technology, the processes would focus on development of systems for metal recycling to enable real-time monitoring, optimize resource allocation, and improve overall operational efficiency.

The R&D projects will also involve Collaborative robotics programs involving Development of robots also known as cobots, use cameras, robotic arms, grippers, and conveyor systems to lift, move, and stack materials as needed. These can also perform a wide range of tasks such as material handling, assembly, inspection, and maintenance alongside human workers.

Mines ministry is also focusing on development of energy recovery systems that would help in making mining more sustainable. In this the projects would focus on development of low cost heat exchangers or regenerative burners, which can support metal recycling industry for effectively tackling energy losses by capturing and repurposing waste heat generated during the recycling process. It will also involve process and technology development for production

of hydrogen from dross. The projects would also design and develop pit furnaces with energy efficiency of more than 40%. It has been decided by the mines ministry that all R&D project proposals should have mandatory 20% participation from the MDME sector as financial contribution or at least 15% cash contribution. In case of CSIR Labs, co-funding from CSIR of at least 25% of the total project cost or total cost of capital equipment, whichever is higher would be required. Science & Technology (S&T) projects are funded through grant-in-aid by the Ministry of Mines through the process of project evaluation by Project Evaluation and Review Committee (PERC) and recommended projects are approved by the Standing Scientific Advisory Group (SSAG) constituted by the Ministry. The funding for each project would be decided after receiving project proposals and the grant could go up to 100% of the project cost on a case by case basis.

Indian sign language brings hope for deaf students aspiring to learn STEM subjects

CSIR-IMTECH

12th November, 2023

To give wings to the dreams of deaf science aspirants, the central government has got on board scientists and deaf special education experts to train sign language interpreters and create signs on terms and concepts on STEM (science, technology, engineering and math) for enabling higher education in the Indian Sign Language (ISL). This is in line with the National Education Policy (NEP) that has sought standardisation and development of curriculum in ISL for inclusive education. It is estimated that around 6% of world population suffers from disabling hearing loss. As per Census 2011, there are more than 50 lakh deaf and hard of hearing people in India. However, one rarely sees any of them in STEM-related fields with lack of accessible learning resources being a key factor. "To bridge this gap, CSIR-Institute of Microbial Technology (IMTECH) in Chandigarh and Delhi-based Indian Sign Language Research and Training Centre (ISLRTC) have joined hands to build a network of ISL interpreters equipped in STEM terminology and concepts," said Rajesh Aggarwal, secretary, department of empowerment of persons with disabilities.

The two organisations will work on creating terms and concepts in ISL for classes 9 to 12 students. While all NCERT school textbooks for classes 1 to 6 are available in ISL including science, most deaf students fail to find schools willing to offer science stream at the plus-two level due to the lack of adequate resources in ISL. Showing the way forward is the first of its kind project in the country 'Indian Sign Language Enabled Virtual Laboratory' (ISLEVL) under the CSIR's 'JIGYASA' programme under which experts are creating specialised digital content to educate the deaf by ISL translated contents in STEM. 103 new signs and 200 content videos on scientific concepts have been developed by a team led by principal scientist at IMTECH, Dr Alka Rao, with the assistance of deaf special education experts.

Four km sewage plumes rising from deep sea on Mum coast, disrupting sea salinity: Neeri Study

CSIR-NEERI

12th November, 2023

Partially treated and untreated sewage discharged from outfalls in Bandra and Worli are spiralling into toxic plumes shrouding at least 4sqkm area of Arabian Sea and bringing down the sea surface salinity (SSS), as per a study by CSIR-NEERI's wastewater technology department. Outfalls are designed to discharge treated wastewater offshore at a depth that does not adversely affect human or marine life.

The expected sea salinity is between 35 and 36 practical salinity units (PSU). However, the study found PSU varying from 30 to 34 units on different intra-tidal conditions — flooding, high or low tides. As the area is a recreational and fishing hub, Neeri experts sought to hold out a warning to tourists on sewage plumes to prevent exposure to sewage-contaminated sea water.

Mumbai, one of the top 10 megacities in the world with over 2.3 crore population, has seven wastewater treatment facilities (WWTFs) at Colaba, Worli, Bandra, Malad, Ghatkopar, Bhandup and Versova operated by the city authority. Bandra and Worli WWTFs are the only outfalls on Mumbai's west coast that discharge partially treated sewage, the study states. Colaba, which has an outfall system, and other WWTFs discharge sewage into creeks.

Every plume that spreads away from source gets wider and straddles several miles, depending on contributing sources — type, multitude and size. The NEERI study found that “plumes are the result of massive entrainment of fluids from marine outfalls on a daily basis”. Surfacing of sewage discharged by diffusers is referred to as a plume when a different characteristic fluid is entrained into sea from any source.

“Continual discharge of partially treated wastewater, particularly in large quantities will undoubtedly alter salinity levels of seawater and hurt marine ecosystems that rely on stable

salinity levels and may be adversely affected by high nutrient load of wastewater. Fishing activity was also observed in the area. Human and avian life dependent on marine life too will be disrupted,” said senior research fellow Hanisha Mamidiseti, who did the study based on satellite images and remote sensing.

Dr Ritesh Vijay, senior principal scientist, Waste Water Technology department, CSIR-NEERI, said immediate measures are needed to curb coastal pollution. “It’s only possible when we are able to collect, treat and recycle sewage, instead of discharging it in a creek or ocean,” said Dr Vijay, who is the study supervisor. The study was carried out using satellite images and data from 2013 to 2014 and one image from 2018.

How our dirty air is inspiring innovation

CSIR-IMTECH

12th November, 2023

Domestic air purifiers were almost unheard of a decade or so ago but with air quality plummeting across cities, it's become the new gottahave-it home appliance. This rising demand has also inspired a lot of innovation, be it on Indian campuses or in the R&D labs of global appliance giants.

Engineer-turned-entrepreneur Ravi Kaushik, who grew up in Delhi and saw the city's air take a turn for the worse every winter, says he was surprised to find that even people who owned purifiers hardly ever turned them on.

“If you ask people with air purifiers how often they use it, it's mostly for two months of the year. Say you enter a room, you first turn on the light and then some kind of ventilation like an AC or fan,” says the 29-year-old CEO of Airth. As most people are loath to turn on yet another device, his idea was to incorporate access to cleaner air into air conditioners themselves. Airth's filters can be attached via velcro to split ACs, making one's air conditioner act like an air purifier. He describes the product as a topi (cap) you put on your AC. While the idea was born when he was studying environmental engineering at IIT-Bombay, it was developed at IIT Kanpur & IISc Bangalore, and now retails on e-commerce sites at a price of around Rs 3,000-4,000.

Urban Air Labs is a Delhi-based startup that has developed a more sustainable plant-based alternative to mechanical purifiers. Co-founder Sanjay Maurya says, “Mechanical purifiers are a quick fix solution. But their filters get clogged and they have to be thrown away, at which point it becomes someone else's problem. It didn't seem right that you're creating a new set of problems to solve another one,” he says, pointing out that it would take almost 40 years for HEPA filters to naturally degrade.

In response to this, the startup worked on developing a plant-based alternative. “Plant-based air cleaning is something that’s being studied in multiple universities abroad and Indian traditional knowledge suggests the use of tulsi or peepal trees for this purpose. We tested this out and found that while plants do clean the air, the process is very passive. So, you’d need about 100 plants to clean the air of even a small room,” Maurya says.

The question then became about how one can magnify this natural ability. After years of R&D, they developed products called UBreathe. Essentially, you plug a plant (they have a list of 10-odd plants that’ll do the trick) into their machine and it absorbs polluted air from the surroundings and releases clean air. Their technology, backed by IIT Roorkee and Kanpur, and tested in IIT-Kanpur’s air purification lab, is currently pending a patent. They retail three sizes of products, the smallest costs Rs 3,500 and the largest retails for Rs 40,000.

Large conglomerates are also racing to come up with better ways to clean the air though their devices are priced higher. Philips, which already sells a range of purifiers, has come up with a mask that is a portable purifier. It is battery-powered with a built-in fan that leads to constant circulation and is priced around Rs 7,000. Dyson has put a purifier within headphones that cancels noise and pollution but with a stiff price tag of \$700 (Rs 58,000). It can monitor AQI with the added bonus of looking like something out of Batman.

Airth’s AC filters, which have been validated by CSIR-IMTECH and are now being incubated at Centre for Medical Innovation & Entrepreneurship at AIIMS, have been selling well, even in months when AQI is not severe. Kaushik says they were surprised when orders came in from cities in Kerala and Coimbatore in Tamil Nadu where the air is nowhere as bad as the metros. “A lot of people in south India use our filters to tackle dust. One customer told us that they use a mosquito net that his wife would clean monthly and now, after four months of using Airth, no cleaning is required,” he says.

Another startup is Nanoclear, which specialises in nanofiber technology to tackle dirty air. Founder Prateek Sharma claims their devices can filter out the smallest of pollutants like PM

10, PM 2.5, pollen, dust and mites. “We have a number of products. The first one we launched was the nasofilter, a wearable air purifier that sticks inside the nose,” he says. They use this technology to create mesh filters for ACs and windows as well.

The market has seen some fluctuation in recent years, he admits. “After three years of R&D, we launched in 2018. It did very well during Covid, when we adapted the product to also filter out bacteria and viruses. But after Covid, people felt fed up with protective gear,” he says. So, while sales surged during pollution season, they plateaued the rest of the year. That is partially why they’ve used this technology to create a product they hope is evergreen — cigarette filters that claim to help people quit smoking. “We have three categories of filters— one filters out 30% of the tar in a cigarette, the next does 50% and the last one filters out 80% of tar and nicotine. This is now our top-selling product,” he says.

Maurya says the long-term goal is to create an air wellness space, with pollution only being one part of it. Being able to control the air in our surroundings — whether to prevent allergies or to repel mosquitos — can be a broader category.

And while all this anti-pollution tech is great for those who can afford it, the truth is that it still won’t make the air outside our homes and offices any cleaner.

Mumbai Air Pollution: More than odd-even, graded action needed to junk old vehicles, say experts

CSIR-CRRI

11th November, 2023

To reduce vehicular pollution in Mumbai, an odd-even number scheme akin to Delhi is among the ideas being thrown up, especially since Mumbai has the highest density of vehicles per square km in the country.

Shifting to mass or greener modes of transport would reduce air pollution, say experts. But a graded action plan such as banning BS3, BS4 and diesel vehicles and promoting BS6 and electric vehicles, before levying a fee on non-green vehicles for entry in congested areas would be easier to implement in Mumbai, they added. Some analysts said the odd-even system may even encourage people to buy an extra odd or even numbered car.

The odd-even rule of road rationing was implemented first in Delhi in January 2016 when air quality index (AQI) rose to over 450, which is considered "very severe". The rule, restricting movement of cars on the basis of the last digit of the number plates, was implemented twice in 2016 and once in 2019. A CSIR-CRRI study observed that among the most tangible outcomes was absence of congestion and gridlocks on arterial stretches on weekdays. Average level of PM_{2.5} (suspended particulate matter of 2.5 micrometer diameter) was only marginally less than on the same days in previous years. An IIT-Delhi study also found that rationing reduced air pollution by only 1-3% while Delhi Technological University stated in a 2019 study that the level of particulate matter had reduced by 4.7-5.7%.

Milind Kulkarni, who has a doctorate from IIT Mumbai on air pollution, said, "If implemented in Mumbai, odd-even will bring improvement in air quality but it may not be significant. On the other hand, considerable efforts and resources will be required to educate the public. Studies show there was improvement of only 15-16% in AQI after implementing such measures in Delhi." Kulkarni said government in Maharashtra should instead act against heavy vehicles with excess emissions and encourage adoption of Bharat 6 standards. "Also, we

should use sensors and IoT-based monitoring to identify pollution hotspots in Mumbai in real-time and focus actions on these hotspots," he added. Sree Kumar Kumaraswamy, programme director at World Resources Institute, said experiments like in Delhi will create awareness and prompt a shift to mass transport and car-pooling. But he agreed that graded action -- reducing older polluting vehicles, promoting green vehicles, and fining offenders in sensitive areas -- would be more effective. "Enhancing BEST services as feeders to railways and metro could help. BEST ridership increased immediately by around 30% when bus fare was reduced in 2019," he added.

Asked about the feasibility of an odd-even scheme on Mumbai roads, transport commissioner Vivek Bhimanwar said "such a system has not been much of a success anywhere." "It could result in buying of more vehicles - with owners having two cars, one odd and one even," he said.

According to some experts, the effective system for Mumbai could also be a "certified car parking system" on the lines of Japan. All privately owned automobiles in Japan need a specific parking slot. Parking by the roadside is prohibited there. Said Bhimanwar, "It is high time to think of a system of certified parking on the lines of Japan. Earlier, it could not be done because infrastructure was not good. But in a year or two, public infrastructure will be available in Mumbai. Also, 80-90% of Mumbaikars will have access to the Metro within 500 metres distance in near future. We can then restrict car registrations and allow only those with certified parking area to own a car."

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