Dr Harsh Vardhan Elected as Chair of WHO Executive Board

Dr Harsh Vardhan, Union Minister for Health, Science & Technology and Earth Sciences and Vice President of the Council of Scientific and Industrial Research (CSIR) has taken over the charge as Chairman of the World Health Organization (WHO) Executive Board on 22 May 2020. Dr Vardhan has been leading the fight against COVID-19 in India.

The WHO Executive Board comprises 34 members elected for a term of three years. The chair of the board is elected by its members on being nominated by the Regional Committees of the six WHO Regions on a rotation basis. The board aims to implement the decisions and policies of the Health Assembly and advises and facilitates its work.
In The News

Addressing the 147th WHO Executive Board session virtually as its Chair, Dr Vardhan said, “I feel deeply honoured to have the trust and faith of all of you. India, and my countrymen, too, feel privileged that this honour has been bestowed upon us. I will work to realise the collective vision of our organisation, to build the collective capacity of all our member nations and to build a heroic collective leadership.”

Dr Harsh Vardhan further said that WHO is already providing leadership to the entire world in the sphere of public health, engaging with partners for joint actions, shaping the research agenda and stimulating the dissemination of valuable knowledge. The need is to catalyze further change. Health is central to enhancing human capabilities. Protecting the health of those without wealth should be the core philosophy of our close alliance at the WHO, he added.

Regional Director for WHO South-east Asia Dr Poonam Khetrapal Singh congratulated him and said, “Dr Harsh Vardhan has assumed this post at a very challenging time. I wish him all the best in steering the Executive Board as it addresses this defining pandemic and other public health issues. Dr Harsh Vardhan has a rich experience in public health. He is the pioneer of India’s successful pulse polio programme and has been in the forefront in the fight against tobacco and many other issues. The world can now gain from his expertise and experience.”

Dr Harsh Vardhan has also been a member of several prestigious committees of WHO like Strategic Advisory Group of Experts (SAGE) and the Global Technical Consultative Group (TCG) on Polio Eradication. Besides, he has also served as an Advisor to the WHO.

CSIR-NCL Controls Acetic Acid Leakage Accident in Pune

An acid leakage accident from a 30 metric tonne tanker happened late night on 27 May 2020 near Chandni Chowk, Pune. The incident took place about 10 km away from the CSIR-National Chemical Laboratory (CSIR-NCL) campus. It created panic among the local residents and people working nearby as it caused breathing problems and irritation in the eyes. A team of CSIR-NCL scientists immediately swung into action and rushed to the spot after coordination with the Police Control Room.

The leakage chemical identified as acetic acid, has a boiling point of 118°C, is highly corrosive and toxic on inhalation, and its vapour can be flammable. A team of about twelve scientists and technical staff led by Prof. Ashwini Kumar Nangia, Director, CSIR-NCL, reached the site at around 11:30 pm with a truck loaded with several bags of Ammonium Bicarbonate (ABC) which was available at CSIR-NCL.

The team controlled the leaking vapours and the smell of acetic acid by throwing lumps of ABC powder on the surface of the leaking chemical and on all the sides of the transporting vehicle every 15 to 20 minutes for the next 5 hours. The difficult challenge was to make sure that the leaking acid from the tanker was periodically kept neutralised by adding base ABC.

At around 2 am, a team from the company and transport agency came to transfer the acetic acid to another tanker.
with the help of police and fire brigade people. The situation was stable and kept under control by the CSIR-NCL team present that continued to neutralise the acetic acid with ABC till all of the acetic acid from the leaking tanker was transferred to another vessel by early morning.

Prof. Ashwini Kumar Nangia said, “Had the spreading of acetic acid vapours continued till morning without neutralisation, the situation could have been very serious and hazardous for people in the neighbouring areas. We had several bags of ABC chemical, which is used for eco-friendly POP Ganesh idols immersion. This was a fortunate coincidence which came in handy readily.”

The CSIR-NCL team visited the site again next morning at 9:30 am and guided in the final clean-up of the accident site which was completed successfully by the fire brigade team and police.

#CSIRFightsCovid19

“Ever since the Coronavirus pandemic broke out, CSIR has mounted a strategic, well-coordinated and integrated approach towards mitigating the Coronavirus outbreak ranging from containing the spread of the virus by providing sanitisation and disinfection solutions to equipping the frontline workers and health warriors with protective gear, and from exploring repurposing of existing drugs to discovering new drugs and vaccines. Here are some major recent developments.

Digital and Molecular Surveillance
Surveillance at the level of the virus, humans, and geographical origins and distributions is a critical step in combating Covid-19. While molecular surveillance involves large-scale sequencing of viral genomes, digital surveillance utilises big data at the population level. CSIR is using digital and molecular methods to conduct surveillance using a three-pronged approach; (i) gathering information about the virus (ii) pooled testing for greater outreach (iii) patient-centric approach.

- Community surveillance pilot project: In Kolar community surveillance pilot, a survey of 1100 persons including 300 doctors and hospital staff has been carried out. RT-PCR based testing and RBD Homemade ELISA testing, which have 98% sensitivity and 99% specificity, have been deployed for the surveillance.

- CSIR-ICMR MoU on clinical data collection and sharing: CSIR-IGIB and ICMR have entered into an MoU for collection and sharing of clinical data, which will accelerate the digital and molecular surveillance aspect. Eighteen hospitals are part of the network for providing patient samples and metadata.
A combination of digital and molecular surveillance with rapid diagnosis is the need and CSIR is striving towards that using multiple strategies.

- **Genome sequencing**: CSIR-IGIB has completed sequencing of 250 genomes, of which >100 have been deposited at the Global Initiative on Sharing All Influenza Data (GISAID) database. Viral samples have been received from Kerala and the institute has tied up with government and private hospitals for sample collection. So far 166 viral genomes have been deposited by CSIR labs in the database.

- **AI-based diagnosis**: CSIR has initiated efforts to reduce the time taken for diagnosis using Artificial Intelligence tools. The “CovBase-AI” is an artificial intelligence algorithm that can screen a Chest X-ray and distinguish between normal and abnormal scans with a high degree of accuracy.

- **Mega testing labs**: CSIR proposes to create mega labs in major cities across India for keeping the economic and commercial hubs open for business during this pandemic. These labs will use ultra-high-throughput sequencing of SARS-CoV-2 using the Novaseq 6000 platforms. The advantage of this platform is that, when it is combined with automation, it can scale to 3000 to 6000 samples every 12 hours, thus increasing scope and lowering costs.

- **ELISA-based kits**: CSIR is developing new ELISA-based kits to improve the scope of the existing ones. The commercially available serology kits indicate the presence or absence of SARS-CoV-2-IgG. However, the ELISA being developed by CSIR is aimed to determine viral titers. Plasma from convalescent donors will be collected and used for validating the serology ELISA.

- **Faecal DNA** is also being collected for future research on the role of the gut microbiome in COVID-19 disease.

- **CSIR-IGIB** has developed a sample sequence workflow for micro labs. Employing the use of the Oxford Nanopore Technology (ONT), the sample run on this system can be studied for understanding the COVID-19 footprint in India.

**Rapid and Economical Diagnosis**

The key to flattening the curve of growth in Coronavirus cases is the detection of the infected at the earliest and isolating them. A combination of digital and molecular surveillance with rapid diagnosis is the need and CSIR is striving towards that using multiple strategies.

Till date, CSIR laboratories have tested about 34,500 samples for COVID-19, which includes about 8,000 tested this week. In addition to this, CSIR labs have also facilitated testing of 13,500 samples in the government hospitals around them.
● **CSIR-IIP as a testing lab**: CSIR-Indian Institute of Petroleum, Dehradun commenced RT-PCR testing of COVID-19 patient samples. The newly developed state-of-the-art BSL-2+ facility was inaugurated by Mr Yugal Kishore Pant, Additional Secretary, Health & Director, Medical Education, Uttarakhand. This facility is designed using a porta-cabin so that it can be replicated in remote areas. The testing facility is capable of processing about 100 patient samples per day.

● **COVID-19 testing lab inaugurated in CSIR-NEIST, Jorhat**: A COVID-19 testing laboratory has been established in the Jorhat campus of the North East Institute of Science and Technology (NEIST). Dr Himanta Biswa Sarma, Minister of Health and Family Welfare, Finance, Education (Higher, Secondary and Elementary), Transformation and Development, PWD, Govt of Assam, inaugurated the laboratory. A team of 10 scientists of the institute is actively involved in isolation of RNA from the virus besides 40 other staff members are acting as support system. The institute’s Biotechnology Division is playing a pivotal role in carrying out RT-PCR-based COVID-19 testing. Besides, the Govt of Assam and the district administration of Jorhat are actively cooperating and facilitating the efforts put in by the institute.
Nested PCR enables more sensitive detection of the coronavirus. The technique also enables pooling 20 samples for testing (as compared to the current ability to pool 5 samples together) in areas where COVID-19 incidence is not too high or too low.

Developments/Improvements in existing technologies/methods:

- **Paper-based detection**: In addition to Tata Sons, CSIR-IGIB’s paper-based COVID-19 detection kit, FELUDA that is under validation by ICMR, has attracted the attention of 17 more companies who are interested to adopt the technology. An agreement with Trivitron Neuberg is the latest addition.

- **Nested PCR**: During the week, CSIR-CCMB reached an advanced stage of Nested polymerase chain reaction (Nested PCR) development. Nested PCR is a modification of polymerase chain reaction intended to reduce non-specific binding in products due to the amplification of unexpected primer binding sites. This enables more sensitive detection of the coronavirus. The technique also enables pooling 20 samples for testing (as compared to the current ability to pool 5 samples together) in areas where COVID-19 incidence is not too high or too low. This strategy also does not need a qPCR machine, and can be done with a regular PCR setup that many more biology and pathology labs have.

- **Large scale sample testing using NGS**: CSIR-CCMB has partnered with Syngene to use large scale genome testing methods using Next-Gen Sequencing which can test up to 10-20,000 samples in a day at a cost of Rs 25 per sample. This would be ideal for testing in containment and red zones.
● **Pooled sample testing:** To further increase the pace and scope of testing, CSIR has developed methodology for pooled sample testing. Diagnostic assays using quantitative Polymerase Chain Reaction most commonly process patient samples one by one. While this is usually an effective and reliable method, the current efforts against the COVID-19 pandemic demand more efficient measures. Diagnostic assays can be scaled up by the method of High-Throughput qPCR via sample pooling. Pooling, the action of combining multiple samples into one tube, is most effective when the chance of positive detection of the target, SARS-CoV-2 RNA, is low. In such cases, large groups of samples can be conclusively classified as negative with a single test, with no need to individually test every sample.

● **Improved and simplified diagnosis of COVID-19:** A new method using dry swabs and with no step of RNA isolation, which is laborious and expensive, has been developed. This is cost-effective and can be used as a quick screening procedure. In addition, sensitivity is enhanced by at least 20% by using RNA isolated from TE buffer extract compared to the traditional method.

● **Feluda test validation:** Feluda, the paper-based diagnostic kit developed by CSIR-IGIB for testing samples for COVID-19 is on a fast track development and commercialisation. The Indian Council of Medical Research (ICMR) has devised a protocol for the approval process of the diagnostic kit.

● **RT-LAMP diagnostic test:** A new diagnostic technique of RT-LAMP for COVID-19 has been developed by CSIR-IIIM and Reliance Indian Limited (RIL). It is cost-effective, fast (30 min), needs simple instrumentation and has been tested on patient samples and larger validation is underway.
Repurposed Drugs/New Drugs/Vaccines/Ayush Products

To combat the virus, CSIR is exploring all avenues and supporting new ideas that have a clear deployment strategy. CSIR has further defined its strategy in this vertical by setting up focused groups to look at multiple pathways for developing drugs: i) Molecular modelling of drugs; ii) Host-target interactions; iii) Crystal engineering; iv) Batch to continuous process; v) In-silico screening of existing drugs and natural products; vi) Scouting for non-infringing routes, and vii) Host-dependent pathways for APIs.

Repurposed Drugs: CSIR is working with Cipla and other industries for leading repurposed drug candidates Remdesivir and Favipiravir by synthesizing API and Key Starting Materials and providing to the industry.

- Remdesivir has received emergency approval by FDA and Gilead has given voluntary license to several Indian companies. CSIR is working on cost-effective synthetic processes and has already demonstrated to industry.

- Cipla has received approval for clinical trials of Favipiravir which are set to begin soon. CSIR-IICT is working with Cipla. Further, CSIR-IIIM is working on cost effective synthetic process for Favipiravir with M/s Anaphar and also niclosamide and ribavirin internally.

- CSIR-CDRI has submitted application to DCGI for Umifenovir and many CSIR labs are working on synthesis of repurposed drugs so as to build a pipeline.

- Host-dependent pathways for APIs: A combination of Bromhexine, the mucolytic drug, and Favipiravir, the antiviral targeting RdRp of COVID-19, is being evaluated for clinical trials.

- Sepsivac clinical trials: CSIR and Cadila Pharmaceuticals are conducting three clinical trials to evaluate the efficacy of an existing gram-negative sepsis drug called Sepsivac (Mw) for COVID-19. The three trials are on critically ill COVID-19 patients; hospitalized (but not critically ill) patients, and high-risk contacts of COVID-19.
  » The clinical trial on critically ill COVID-19 patients is progressing well at AIIMS-Bhopal, AIIMS New Delhi and PGI Chandigarh.

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<thead>
<tr>
<th>Drugs in the Pipeline</th>
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<tr>
<td>Umifenovir</td>
<td>Broad-spectrum Antiviral</td>
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<td>Baricitinib</td>
<td>Rheumatoid Arthritis</td>
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<td>Ruxotinib</td>
<td>Myelofibrosis</td>
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<td>R-20-0001</td>
<td>Anti-hypertensive</td>
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<td>Camostat mesylate</td>
<td>Chronic pancreatitis &amp; postoperative reflux</td>
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<td>Niclosamide</td>
<td>Influenza A and influenza B flu</td>
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<td>Ribavirin</td>
<td>RSV infection, hepatitis C</td>
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<td>Tilorone</td>
<td>Oral Synthetic interferon inducer</td>
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<td>EID 1931 &amp; 2801</td>
<td>SARS and MERS</td>
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<td>Galidesivir</td>
<td>Broad-spectrum Antiviral</td>
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<td>Centhaquin</td>
<td>Hypotensive agent</td>
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Clinical trial of ACQH: CSIR and Sun Pharma have received approval for Phase 2 clinical trial of a phytopharmaceutical formulation, ACQH developed by CSIR-IIIM and DBT-ICGEB for dengue.

This is the first phytopharmaceutical to receive clinical approval and trial will start on 5 June 2020.

Clinical trials on Ayush drugs: CSIR with ICMR and Ministry of Ayush is conducting clinical trials for Ayurveda interventions as prophylaxis and as an add-on to standard care to COVID-19. They include Ayurvedic medicines such as Ashwagandha, Yashtimadhu, Guduchi Pippali, and a polyherbal formulation (Ayush-64). Trials to start soon.

Clinical trial protocols are being worked out with Ministry of Ayush.

Clinical trials on convalescent plasma therapy: CSIR-IICB has received approval for a clinical trial for plasma therapy.

The plasma therapy RCT has been initiated in Kolkata. Currently, convalescent donors are being recruited and plasma being collected. These plasma samples will be very useful for validating the serology ELISA as well.

CSIR-CCMB collaboration to develop antibody fragment-based immunotherapy: CSIR-CCMB and University of Hyderabad (UoH) are collaborating with Vins Bioproducts Ltd, an antisera manufacturing company, to develop antibody fragment-based immunotherapy for the treatment of COVID-19. Plasma-based passive immunity against COVID-19 has several limitations. The use of antibodies has been an effective method in protecting against several human and animal diseases. Scientists are exploring alternative strategies of using horses to generate antibodies against the SARS-COV-2 viral antigens. Horse-based immunoglobulins can be produced in large quantities as a promising alternative therapy, which would be economical and can be made readily available to a larger population.

Drug Hackathon
CSIR and All India Council for Technical Education (AICTE) have launched a hackathon for drug discovery for Covid-19 disease.
The Principal Scientific Adviser of the Government of India is supporting the hackathon. The ideas holding potential that emerge from the hackathon will be developed by CSIR labs, startups and any other interested organisation. Indian students and researchers from across the world can participate in the competition.

**Hospital Assistive Devices and PPEs**

Ever since the pandemic reared its devastating head in the country, CSIR has been introducing low-cost and effective hospital assistive devices and PPEs and consistently improving their efficiency and design. CSIR has made considerable progress in this area and many technologies and designs have been transferred to the industry while some are at the stage of beta testing, which will be followed by certification.

- **CSIR-CMERIC develops mechanical ventilator**: CSIR-Central Mechanical Engineering Research Institute (CSIR-CMERIC), Durgapur, has developed a Mechanical Ventilator.

These Automated Portable Mechanical Ventilators might be deployed to help huge volumes of prospective patients if required. The prototype has been equipped with multiple life-saving control features such as Tidal Volume, Breaths per Minute and Inspiratory/Expiratory ratios.

Keeping in mind the probable mass requirement of this Life-Saving medical equipment, portability and cost-effectiveness are two of the most primary elements of the product.

- **Biopolymer Nano coated Medical Grade Mask**: CSIR-National Chemical Laboratory (CSIR-NCL), Pune, has developed a superior face mask which has better filtration efficiency than the available face masks in the market. CSIR-NCL’s patented bacterial nano-cellulose technology along with nano-coating was used for this purpose. The cotton cloth coated in a solution of bacterial cellulose and nano-material completely prevents the penetration of bacterial growth. The Bacterial Filtration Efficiency (BFE) of CSIR-NCL mask is 99.9% and Particulate Filter Efficiency (PFE) is 92.63% PFE. This indicates a high restriction of hazardous particulates. The masks are made for easy breathability, of medical grade and are of low flammability.
**Respiratory Assistance Intervention Device (Respi-AID):** CSIR-CSIO, Chandigarh has developed the Respiration Assistance Intervention Device: A Portable Ventilator (Respi-AID) in collaboration with Govt Medical College and Hospital, Chandigarh. The technology was transferred on a digital platform to M/s Sivapriya Exim Private Limited, Chennai on 29 May 2020.

**Bi-Level Positive Airway Pressure System (Bi+APV1):** Named ‘SwasthVayu’, the BiPAP Ventilator is an electronic breathing device used in the treatment of sleep apnea, lung disease, and to treat respiratory weakness and will be used for COVID-19 patients. Blower motor and controller are the critical components of the BiPAP ventilator and currently are imported from Switzerland. To lower costs, alternate sources in Taiwan and China have been identified for these critical components. The system has been certified for calibration by NABL accredited agencies as well as TUV Rheinland (meeting the minimum requirements of the German Equipment and Product Safety Act). CSIR-NAL will make 25 BiPAP devices and 100 devices will be made by licensee companies. Thus, a total of 125 devices will be made, to begin with.

**Personal Protective Coverall:** The production rights for the coverall developed by CSIR-NAL have been given to MAF Clothing, Bengaluru on a non-exclusive basis. The first lot of 5000 coveralls has been supplied to HLL Life Care, Trivandrum by MAF clothing. CSIR-NAL will soon sign agreements with some manufacturers to start production.

**Mobile indoor disinfection sprayer units:** CSIR-CMERI has developed mobile indoor disinfection sprayer units. These can be used for cleaning and disinfecting pathogenic microorganisms effectively, especially in hospitals. The institute has developed two variants of the indoor disinfection units. One is the Battery Powered Disinfectant Sprayer (BPDS), and the other is the Pneumatically Operated Mobile Indoor Disinfection (POMID). The two units can be used to clean and disinfect frequently touched surfaces such as tables, doorknobs, etc.
The Electrostatic Disinfection Machine will play a vital role in disinfecting and sanitizing public places especially hospitals, poultry, trains and buses, airports and aeroplanes, offices, classrooms and hotels.

- **Electrostatic Disinfection Machine**: CSIR-CSIO has developed Electrostatic Disinfection Machine technology which was transferred to the industry a few weeks ago. As the country eases lockdown and more people get back to work, the machine will play a vital role in disinfecting and sanitizing public places especially hospitals, poultry, trains and buses, airports and aeroplanes, offices, classrooms and hotels. The industrial partner, Rite Water Solutions today announced that it is ready to mass-produce the machine.

- **Palm Safe**
  CSIR-NIIST has developed a Free Hand Sanitizer (“Palm Safe”), the technology was transferred to Tachlog Industry, Trivandrum.

- **Face Mask**: CSIR-CECRI's tri-layered Face Mask with antimicrobial and hydrophobic coating received certification from SITRA.

- **Herbal Inhaler**
  CSIR-National Botanical Research Institute (CSIR-NBRI) has developed a herbal inhaler technology which is ready for transfer to the industry. The inhaler based on ayurvedic formulation, when sprayed on masks makes breathing easier by decongesting the nasal passage.

- **CSIR-NIIST's** technology for air sanitizer was transferred to an MSME M/s Ecocure Technologies.
The KisanSabha app will soon be launched in six languages – Tamil, Telugu, Kannada, Marathi, Gujarati, Bengali & Urdu.

- **Flocculation-based Disinfection Systems**: CSIR-NIIST signed a non-disclosure agreement with CML Biotech (P) Ltd. Angamaly, Kerala for the development of Flocculation-based Disinfection Systems for Pathogenic Medical Waste Disposal.

**CSIR Supply Chain & Logistics Support**

- **KisanSabha App**: The KisanSabha portal and app was launched by Dr Trilochan Mahaptra, Director-General, Indian Council of Agricultural Research (ICAR) on 1 May 2020. In a short time, nearly 30,000 transporters, 3200 farmers, and over 1000 other service providers and customers have already registered. Going by the feedback received, many farmers who have used the app have received higher prices for their produce. The KisanSabha app will soon be launched in six languages – Tamil, Telugu, Kannada, Marathi, Gujarati, Bengali & Urdu.

- **Rapid Health Supply Chain Information Platform**: Aarogypath (आरोग्यपथ), the National healthcare supply chain platform that was initiated recently is now under development. The important functionalities have been identified and the various interfaces (screens) have been finalised. As of now, three stakeholders categories, viz., Manufacturers/Suppliers, Buyers, and Hospital & Labs have been identified for the primary launch.
An MoU was signed on 6 June, 2020 between CSIR-Institute of Himalayan Bioresource Technology, Palampur, HP and Department of Agriculture, Government of Himachal Pradesh, Shimla. Dr Sanjay Kumar, Director, CSIR-IHBT and Dr R.K. Koundal, Director of Agriculture, Shimla HP along with Dr N.K. Dhiman, Additional Director of Agriculture (North Zone), Dr Rakesh Kumar and Dr Ashok Kumar, scientists of CSIR-IHBT cum PI of the project signed the agreement.

As per the agreement, CSIR-IHBT and Department of Agriculture, HP Govt joined hands for strategic partnership as well as implementation partnership based on principles of mutual strengths and benefits for the purpose of increasing farm income, livelihood promotion and rural development in Himachal Pradesh through transfer of innovations by means of capacity building, skill development and other extension activities of prospective farmers and Officers of Agriculture Department, H.P in the area of saffron and heeng cultivation. Speaking on the occasion Dr Sanjay Kumar Director, CSIR-IHBT, said that saffron and heeng are the most valuable spices of the world and widely used in Indian cuisine since time immemorial. In India, the annual demand for saffron spice is 100 tons per year but its average production is about 6-7 tons. Hence a large amount of the spice is being imported. Currently around 2,825 hectares of land is under cultivation of this golden spice in J&K.

CSIR-IHBT has developed production technology for saffron and introduced its cultivation in non-traditional areas of HP and Uttarakhand, said Dr Sanjay Kumar.
Director Dr Sanjay Kumar added that that there is no production of heeng in India and currently around 1200 metric ton of raw heeng worth Rs 600 crores is being imported from Afghanistan, Iran, Uzbekistan. CSIR-IHBT has introduced six accessions of heeng from Iran through NBPGR New Delhi and standardised its production protocols under Indian conditions. Heeng is a perennial plant and it produces oleo-gum resin from the roots after five years of plantation. It can be grown in unutilised sloppy land of cold desert region. Introduction of these crops will reduce the import.

For production of saffron and heeng in HP, CSIR-IHBT will provide technical know-how to the farmers, impart training to state agriculture department officers and farmers, set up corm and seed production centres of saffron and heeng, respectively, in the state. Besides this technical support for achievement of physical targets of the project, technical supervision of saffron production areas, and exposure visits of farmers will also be done. A total of 750 acres of land will be covered under these crops in the state in the next five years.

Dr RK Koundal, Director of Agriculture, expressed that this project will enhance the livelihood of the farmers and will benefit the state and country.

A state of the art tissue culture lab will be established for large scale production of quality planting material of these crops. This programme will improve the farmer wellbeing by providing better income prospects as well as state will be benefited by cultivation of these high value crops.

### Lectures

**Lecture on Sundarban Mangrove Ecosystem as Saviour of Kolkata from Aerosol Pollution**

The Millennium Institute of Energy & Environment Management (MIEEM), a Kolkata-based NGO joined hands with the CSIR-Central Glass & Ceramic Research Institute (CGCRI), Kolkata, to organise a lecture as a part of its monthly lecture programme on 13 March 2020 within CGCRI premises. The lecture titled “Role of Sundarban Mangrove Ecosystem: The Saviour of Kolkata from Atmospheric Aerosol Pollution” was delivered by Dr Abhijit Chatterjee, Associate Professor, Environmental Sciences Section, Bose Institute, Kolkata within the CGCRI premises.
Dr Chatterjee emphasised on how aerosols, which are suspended particulate matter of different chemical compositions with size varying from few nanometres to several micrometres, affect the human health and climate. The speaker distinguished between direct and indirect effects of aerosol on radiation from sunlight. While on direct impact, sunlight either gets scattered by reflection or refraction resulting in cooling or gets absorbed causing warming, in the indirect impact, cooling takes place due to increased cloud lifetime and albedo.

Dr Chatterjee talked about the concept of ‘Blue Carbon’ that was first declared in 2009 in the United Nations Climate Change Conference at the Conference of Parties 15(COP15) in Copenhagen.

Blue carbon refers to CO$_2$ removed from the atmosphere and stored as organic carbon within the sediments as well as plants mostly in the coastal ecosystems. Twenty per cent of the countries in the Paris Agreement, India included, in 2016 pledged to use blue carbon in Nationally Determined Contributions (NDC). He emphasised on the importance of blue carbon as mangroves are among the most carbon-rich forests in the tropics.

Dr Chatterjee informd that aerosols generated by burning of agricultural wastes in the south Indian states along the Eastern Ghats are driven by winds over the Bay of Bengal and travel a long distance to rush towards Kolkata through the Sundarban forest with the onset of summer. Shifting cultivation in Odissa and Chhattisgarh and the accompanied forest clearing and burning leads to emission of SO$_2$ and NO$_2$, VOCs, PAHs, ultrafine aerosols and black carbon called soot.

Presence of high amount of organic acids contributed by mangroves over the Sundarbans’ atmosphere along with high amount of ultrafine soot particles from the Eastern Ghats biomass burning increases the size of soot particles. Cloud droplets scavenge various metals, fly-ash species, sulphur compounds, soot particles, dust particles, etc. The species scavenged within clouds absorb solar radiation and warms the atmosphere of the cloud. The water gets evaporated and cloud burns.

Dr K. Muraleedaran, Director, CSIR-CGCRI summed up the lecture session with his concluding remarks, Mr Subhashis Majumdar and Prof Pranab Roy, President and Secretary of MIEEM also spoke on the occasion.
CSIR-National Chemical Laboratory (CSIR-NCL), Pune, celebrated the International Women’s Day by organising various activities including a half-day symposium on “Women in Science” on 9 March 2020.

Dr Vidya S. Gupta, CSIR Emeritus Scientist, spoke on “History of Women’s Day and Women in science profession right from ancient times”. Referring to the theme of this year’s International Women’s Day 2020 “I am Generation Equality: Realising Women’s Rights” she talked about issues faced by women such as pay parity, different treatment from the colleagues and supervisors resulting in unpleasantness in workplaces, etc.

She highlighted the background and history behind the International Women’s Day and said that three thousand years back, women were considered as equal to men. Many important positions were held by women. She talked about some of the successful women scientists including Merit-Ptah, earliest female scientist and chief physician; Agamede, a healer in ancient Greece even before the Trojan War; Mery the Jewess who was the most famous alchemist who invented several chemical instruments and recent times scientists like Margaret Cavendish, Maria Sibylla Merian, James Barry (a surgeon, who passed degree as a man because of the restrictions on women
“Intellectually, mentally and spiritually women are equivalent to men and women can participate in everything,” says Dr Vidya S. Gupta.

Dr Sharmila Bapat, Scientist, National Center for Cell Sciences talked on “The different shades of cancer metastases”. The mortality in ovarian cancer patients is much higher in comparison with other cancer patients. She talked about the experiments performed in the areas of ovarian cancer research. She explained how the metastatic cascade and cooperative cell migration take place. She also informed about universal programme of Epithelial-to-Mesenchymal (EMT) and Control Cell Media (CCM), which are a set of multiple and dynamic transitional states between the epithelial and mesenchymal phenotypes that define stem-like characteristics and migratory capabilities within tumours. These programmes are relevant for cancer metastases besides reflecting on regenerative capabilities. It is likely to be crucial and considered in patient responses for treatment.

Dr Tuli Dey, Assistant Professor, Institute of Bioinformatics and Biotechnology, Savitribai Phule Pune University (SPPU), Pune, presented her talk on the topic “Women in Science: Why so few?” She reminded a Darwinian concept that “the child, the female, and the senile white all had the intellect and the nature of the grown-up Negro”. She said that although women used to have prestigious status in science; the representation at the Nobel prizes has been only 3% as compared with 97% of men. Besides, the participation of women in Science, Technology, Engineering and Maths (STEM) studies is less all over the world.
She briefed about the current scenario of women education overall; in India, it is 65.46% which is way behind the world's 79.7% and China has 82%. She presented a report on different studies carried out to understand the female representation and participation at STEM studies in different countries. She also spoke on the opportunities and jobs offered to female candidates in R&D labs and universities in the public domain. The percentage is less than 30% in these institutes. But the scenario changes in respect to the universities, appointing about 40% female faculties.

Dr Gayathri Pananghat, Assistant Professor, IISER, Pune, spoke on the topic “Bacterial Cytoskeleton: Diversity in Structure, Function and Dynamics”. She said people often think that bacteria do not have a cytoskeleton; this is what we have been taught right from the school days. Nowadays, it is quite well known that bacteria do possess cytoskeleton and it functions similar to the eukaryotes. There are actin and tubulin like proteins of the bacterial cytoskeleton which perform a wide variety of functions. There are large varieties of cytoskeleton proteins present in bacteria. Many of these are dependent on ATP or GTP for energy polymerization and de-polymerization to perform various functions like cell division.

She said that a hybrid approach has been used in her laboratory at IISER to understand bacterial motility. She threw light on the molecular mechanism to explain the structure and dynamics correlation. It helps to arrive at a 3D structure of the molecule and to know how it functions. She talked about a thin and helical bacterium spiroplasma which doesn't have the cell wall.

Dr Swati Acharya, Assistant Professor, Foreign Language Department, SPPU, presented her views on “Women and Social Sciences”. She said, “Science is a system of thought processes which can be equally applied to social sciences also. It is not only about poetry and not about the subjective interpretation and misinterpretation of the data.” She tried to sensitize the audience to the use of language, purposely manipulated by the media giving an example of a book namely “Men are from Mars Women are from Venus”.

She said objectivity is the crucial founding stone of social sciences. She highlighted a quote by French philosopher: “A woman is not born, she is made a woman with social conditioning, upbringing; so-called cultural values which restrict women from doing whatever she wants.” She shared some of the success stories of women social scientists like Shirin Ebadi, Seyran Ates, Gita Gopinath, WangariMuta Maathai, Gayatri Chakravorty Spivak, Anandibai Joshi, Irawati Karve, etc.

Dr Moneesha Fernandes, Scientist, CSIR-NCL, spoke on “Peptides for cell penetration and the thrombin-binding aptamer”. She talked about the arginine-rich molecular transporters and expression analysis of CPO-pDNA complexes in the skin. She informed the functioning of the cell-penetrating lysine-based dendrimers. She also explained the cytotoxicity and cell permeability.

CSIR-NCL Medical Centre organised a special test camp for thyroid function (T3, T4 and TSH) on 9 March 2020 for women employees free-of-cost in collaboration with Akumentis Pharmaceuticals under the Public Health Initiative programme through Thyrocare. About fifty women employees took the benefit of the test camp.

“Science is a system of thought processes which can be equally applied to social sciences also. It is not only about the poetry and not about the subjective interpretation and misinterpretation of the data,” said Dr Swati Acharya.

Contributed by Ganesh Mane and Prabhakar Ingle (pk.ingle@ncl.res.in), Publication and Science Communication Unit, CSIR-NCL, Pune 411 008
INSPRING YOUNG SCIENTIFIC BRAINS OF INDIA
Inviting entries from School Children (below 18 years) to support their scientific temperament

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DEADLINE
Considering the unusual situation arising on account of spread of COVID-19 pandemic, the competent authority is pleased to extend the last date of receipt of application for CSIR Innovation Award for School Children-2020 [CIASC-2020] from 30.04.2020 to 30.06.2020.

ANNOUNCEMENT OF AWARD
The Award will be announced on or before 26 September 2020 at New Delhi and would be communicated to the Awardees only. The awards will be given to winners on CSIR Foundation Day i.e. 26 September 2020. The cost of travel and stay at New Delhi will be borne by CSIR.

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