

**No. DSIR/MS/2019/05**  
Government of India  
Ministry of Science & Technology  
Department of Scientific & Industrial Research  
MONTHLY SUMMARY FOR THE CABINET  
(For the month of **May 2019**)  
(Part-I Unclassified)

**Ministry/Department:** Department of Scientific and Industrial Research (DSIR)

## **Key Contributions and Activities of CSIR**

### **Societal Sector**

- ***CSIR designed multi-purpose cyclone shelters have saved few lakhs of lives during several cyclones including recent Cyclone Fani.*** In the beginning of May, a powerful storm, cyclone Fani struck the East Coast of India and almost 800,000 people had to be evacuated to cyclone shelters to ride over the storm and damage to life was minimized to few tens of people as opposed to nearly 10,000 in 1999. Significantly, **CSIR-SERC**, Chennai at the request of Indian and German Red Cross, had designed a stilted cyclone shelter for use in Orissa with specialized features in late 1990s. These shelters are believed to have saved few lakhs of people, during various cyclones such as 'Phailin' (October 2013) and Cyclone Fani recently. CSIR-SERC also has the capacity and capability with wind tunnel facilities to carry out pressure measurement studies on scale models of cyclone shelters under simulated cyclonic conditions, which can help in the design of the shelters.
- ***CSIR's various labs carried out relief efforts in cyclone Fani affected regions in Orissa by providing potable water and ready to eat food.*** CSIR and its constituent laboratories carried out painstaking efforts to help victims of cyclone "FANI" affected Odisha state and other coastal areas. Cyclone Fani paralyzed drinking water supply and contaminated many ponds and wells in worst affected Puri district. A customized bus of **CSIR-CSMCRI** housing a water purification and desalination plant came to the rescue of thousands of parched villagers in the peak summer. The special bus is mounted with RO water purification system and has a capacity of treating water at 2000l/hour. It could purify any kind of contaminated water, including silt-laden left by floods, and brackish water along coastal areas and make it potable. It worked in coordination with the state rural water supply and sanitation (RWSS) division and moved to affected and was stationed in several villages in Kakatpur and Satyabadi areas in the district. The bus works on 23-kilowatt power produced by generator attached to the vehicle's engine and also has also solar panels on its roof and does not need any external power supply. **CSIR-CFTRI**, Mysore, distributed about 2.5 tonnes of food that have been specially prepared containing nutritious food items a combination of seven reconstitutable foods products --instant mixes of poha, upma, ready-to-eat upma, high-protein rusks, high-protein biscuits, long-shelf-life chapati and tomato chutney. **CSIR-IHBT**, Palampur, provided hygienically prepared

nutritious “ready-to-eat food” of about one-lakh units and ready to eat canned food and high energy and protein bars of 20 tonnes for distribution to the affected families. **CSIR-IMMT**, Bhubaneswar, itself was damaged in the cyclone and yet showed resilience and played a critical role of overall coordination the relief work on behalf of CSIR and directed the efforts to the most affected and needy regions of Orissa. ***The significant relief provided by CSIR labs to the victims of cyclone Fani was covered by media which is provided in Appendix.***

### **CSIRs Farmer Centric Activities and Contributions**

- CSIR Aroma Mission has been a flagship program of CSIR and Meghalaya Government launched Aroma Mission to boost cultivation of Aromatic and Medicinal plants and as a part of it Meghalaya Chief Minister inaugurated a processing unit of essential oils and MoA was signed between CSIR-CIMAP and Meghalaya basin development authority for collaborative work.
- Out reach program aimed at improving the income of framers by developing new varieties of Aromatic and Medicinal plants and promoting awareness cum training programs for cultivation, processing and marketing and distribution of seeds. Many such programs were conducted were conducted for farmers in various villages across several states by CSIR labs, **CSIR-IHBT**, **CSIR-CIMAP** and **CSIR IIIM** and more than 500 farmers were involved in the program, during this month.
  - The areas covered are: Tur village, Satohar in Mehla developmental block of aspirational district Chamba(HP); Rajamau and Shivgarh in Raibareilly (UP); Udnapur village, Hargaon in Sitapur (UP); Kangra (HP); Talha village in Sihunta, Chamba; Tharu tribal areas of Bandar Bharari village, Sohna in Dudhwa Tiger Reserve region; Garotha village, Jhansi (UP) Kothawa village in Hardoi in a collaborative project sponsored by HCL foundation; Patha Karka village in Jhansi, UP; Kelia Khurd village in Jalaun district of UP and Dudhawara village, Magarload of Dhamtari district, Chhattisgarh
  - Vulnerable communities of tribal areas and women were focus of the mission and they were trained in incense stick making Sabara tribe at Dalua village near Bhubaneswar, Odisha; women at Inner Wheel Club in Jajpur, Odisha; awareness cum seed distribution programmes for Tibetan Refugee farmers at Bylakuppe and Gurupura settlements in Hunsur, Mysore, Karnataka. Programme for increasing the income of tribal forest dwellers by cultivating aromatic plants at Simlipal Wild Life Sanctuary, Odisha was conducted. More than 100 farmers from 5 tribal villages participated in the one-day awareness programme conducted in Malgoan, Kondagaon in Bastar, Chhattisgarh.
- The agro technology of Citronella (Jor Lab C-5) was transferred to M/s Arunachal Agro Industries, Roing in Arunachal Pradesh by CSIR-NEIST.
- **CSIR-IHBT** signed a MoU with All Mizoram Farmers Union (AMFU) for cultivation and value addition of aromatic plants in Mizoram under CSIR Aroma Mission.
- Technology Developed to Help Shiitake Mushroom Cultivation rich in Vitamin D by CSIR-IHBT, Palampur. It has developed a cost-effective

technology that can help cultivation of highly nutritious Vitamin D enriched shiitake mushrooms in two months' duration against conventional nine-ten months under local conditions and yield is also high i.e. 5-6 kg fruiting body per 1 kg of sawdust substrate. Once taken on commercial scale, the nutritional shiitake mushrooms will boost the revenue of the producers as it has high local and global market demand. The development of the technology is a part of the Government Nutraceutical Mission launched with an aim to ensure nutritional security, enhance farmers' income and provide employment in the country.

- CSIR-IHBT has developed a technique to introduce fruits as snacks and it will not only benefit the farmers but industrialists too. The technique would be introduced to the fruit farmers of HP and waste of produce will decrease and they could get double of price.
- Distribution of blight resistant Sambha Masuri rice seeds to farmers was carried out at CSIR-CIMAP. It was attended by large number of farmers and about 200,000 acres are under cultivation with variety of rice developed by CSIR-CCMB bringing benefits of lab research to farmers.
- Under CSIR-HARIT programme for society, workshop was held for Empowerment of Women in Food Sector through CSIR-CFTRI Technological Intervention For Raichur and Yadgiri Districts, Karnataka.

### ***CSIR Activities towards Environment Protection and Ecology***

- CSIR-NEERI developed 'Greendispo' an Eco -friendly Sanitary Napkin Incinerator. The use of sanitary pads has increased with the help of various awareness programmes but the proper disposal of these napkins pose a hazardous threat to health and the environment. A disposal method has been developed in which the pads were burnt but the smoke from this was still posing a threat to environment. CSIR-NEERI, Nagpur along with ARCE, have developed an electrical disposal machine called Greendispo. The patented machine has a chamber where the pads could be incinerated and there will be controlled measures of fuel. This machine emits hardly any smoke and the machine can burn up to 30-60 pads and it requires minimal energy to function and the trials of the machine has been successful
- CSIR-CBRI and University of Lucknow have developed arsenic bioremediation process by using soil bacteria. Arsenic can be effectively removed from contaminated soil with the help of two indigenous strains (Bacillus flexus and Acinetobacter junii) of bacterium isolated from arsenic-contaminated field. The indigenous strains demonstrated the potential to accumulate arsenic within the cells and transform it into less phytotoxic forms, making the strains more proficient candidate for bioremediation.
- CSIR-NEERI, Nagpur has contributed extensively in carrying out exhaustive studies to understand the causes for various forms of pollution including water and coming up with recommendations to mitigate the pollution towards environmentally sustainable development.
  - NEERI along with Central Pollution Control Board (CPCB) identified the cause of water pollution in the Yamuna as mixing of the drain of fresh water with sewage and industrial effluent, which may cause increase in ammonia levels in Delhi water supply and recommended that

the embankment separating the two drains needs to be raised and construction of a wall and treatment of effluent at CETP Kundli.

- A joint team of the CPCB and NEERI had inspected the quality of the river water at various locations in all three districts of Sonapat, Panipat and Yamunanagar and CPCB has issued directions, for augmentation of sewage treatment plants (STPs).
- Delhi Jal Board has finalized the methods to restore 155 water bodies in Delhi in consultation with NEERI and tenders for work have been issued for 29 water bodies in consultation with NEERI.
- NEERI was involved in bringing out a Manual on Constructed Wetland as an alternative technology for sewage management
- NEERI submitted the environment impact assessment (EIA) report for the proposed Bainguinim solid waste treatment plant to the Goa Waste management Corporation where the garbage woes in and around the state capital have escalated.
- A project to save the Kashmir Stag also called Hangul a critically endangered species using assisted reproductive technology has been started by Conservation of Endangered Species (LaCONES) at **CSIR-CCMB**. They will also screen livestock and wild ungulate for diseases and develop a database a database of diseases. Conservation using genetic methods and breeding is part of a national project to strengthen wildlife conservation for sustainable livelihoods in Kashmir.
- **CSIR-CCMB** has sequenced the Asiatic Lion Genome Sequenced for the first time. The entire genome of a male Asiatic lion has been sequenced and this would help in better understanding the evolution of Asiatic lions and also make possible comparative analysis with other big cats.
- **CSIR-NIO** begins study on soil erosion on Goa and Maharashtra beaches. It has embarked upon a detailed study along Goa and Maharashtra coast to study the threat of soil erosion to the coastline. The study is a part of project under Centre Water Commission (CWC), which had approached the institute with the proposal to study the environment phenomenon of the soil erosion.

## Strategic Sector

- India's dependence on crude imports, and reducing the IAF's carbon footprint received a boost with Indian Air Force's AN-32 fleet allowed to use blended Aviation Fuel, indigenously produced by CSIR-IIP lab at Dehradun. AN-32s are the workhorses of the IAF and the IAF undertook a series of evaluation tests and trials with this green aviation fuel for the last one-year and it has received approval certificate for its use from certification body Centre for Military Airworthiness and Certification (CEMILAC). This is a huge step in promoting the '**Make in India**' mission as this bio-fuel would be produced from Tree Borne Oils (TBOs) sourced from tribal areas and farmers, augmenting their income substantially. It plans to widen the experiment over the next two years.
- **CSIR-NPL** introduces new standards for four base measuring units in India as per global resolution, on World Metrology Day (May 20). India adopted a global resolution to redefine four of the seven base units namely kilogram (mass), kelvin (temperature), mole (amount of substance) and ampere

(current). Due to this adoption a new era for quantum world is opened up by linking all seven base units to fundamental constants or quantum standards.

- **CSIR-IMMT** signed MOU with Mining Mineral Resources (MMR) of Democratic Republic of Congo for utilization of mineral resources of Congo like Niobium, Tantalum, Tungsten and Tin, rare and strategic for India and conduct HRD programs for the executives of MMR, Congo.
- **CSIR AMPRI Bhopal** has developed non toxic shielding materials made of 'red mud' to be used in X ray rooms, CT scan rooms and Cath lab. Atomic regulatory board of Gol has approved the same.
- Bangladesh Oceanic Research Institute (BORI) scientists received a fortnight's training at the **CSIR-NIO** Dona Paula facility. India will assist Bangladesh to upgrade its capabilities in ocean research and human resource training.

## Industrial Sector

- **CSIR-NPL** released 26 Petroleum BNDs (Bharatiya Nideshak Dravya or Indian Reference Material) on World Metrology Day. They were jointly developed by HPCL, will provide traceability for all vital parameters of Petroleum products testing and certification which will be of immense use for BS VI fuels. The initiative will save vital foreign exchange through import substitution for Certified Reference Materials (CRMs).
- **CSIR IICT** opened a Kilo Lab, a first such lab in public sector, that would help scale up drug development research and would be made available to start-ups and small and medium-scale firms for scaling up their research and development.
- **CSIR-NPL** Licensed Technology on Recycling of Plastic Waste into Useful Tiles, through NRDC to M/s. Bengal One Enviro Infra LLP, Kolkata. This technology provides a viable solution for solid waste management problem which is a huge challenge facing the country and boosts **“Waste to Wealth”** initiative of the Government.
- **CSIR-NCL, Pune** signed a Technology Licensing Agreement with the Pheromones Biotech LLP, Hyderabad for the development of an eco-friendly technology for the pest management without toxic pesticides. NCL has developed a new way of delivering agrochemicals to plants, which increases the efficacy and minimizes wastage of expensive pheromones. This technology is envisaged to be deployed as a 'No pump No spray' technology that is well suited for Indian conditions. The Pheromones Biotech LLP/CSIR-NCL collaboration will commercialize solutions for Fall Army Worm, Pink Boll Worm and Helicoverpa that infest corn, cotton, and several other crops.
- **CSIR-CSIO, Chandigarh** signed an MoU with M/s. Dashman Industries, Alwar, Rajasthan for technology transfer of improved Electrostatic sprayer incorporated with usage meter and GPS capability.
- **CSIR labs undertook activities to promote innovation and enterprenurs and start ups.**
  - To boost innovation and Start Ups, **CSIR-NCL Venture Center** conducted training to managers and CEOs of upcoming incubators, on

customized training on various aspects of successfully running a high-impact business incubator

- **Atal Innovation Center at CSIR-CCMB** (AIC-CCMB) organized a MedTech workshop.
- A Skill development program on patent certificate was also organized at **CSIR-NCL**.
- **CSIR-NIEST, Jorhat** hosted entrepreneurs from North East region and to promote Science, Innovation & startup culture in 7 states. A brand new information center for diagnostics, translational & innovation facilities at CCMB were inaugurated.
- **CSIR-NML** conducted an Entrepreneurship Development Programme on "E- Waste Collection & Deconstruction".

**CSIR activities to build capability for Industry 4.0**

- **CSIR-CEERI** and NVIDIA, in technical collaboration with Elixir Systems organized an experiential learning-based workshop in Augmented Reality and Skill Development Course on Internet of Things.
- **CSIR-CSIO** organized a Workshop on Machine Intelligence and Deep Learning
- Skill Development and Workshops were organized by CSIR labs on various areas and few of them are:
  - HPLC/UPLC and Pathological Tools & Techniques for Biomedical applications by **CSIR-CDRI**
  - **CSIR-CBRI** conducted on skill training on Multi-hazard resistant housing & habitat for engineers of Uttarakhand
  - **CSIR CLRI** activities to boost Leather Industry include tailor-made customised course in Leather Products Design Methodology for the discerning from the Indian Leather Industry and working with Leather Sector Skill Council (LSSC) in re-training CLRI trainers in Shoe & Product Design.
- Many CSIR labs celebrated **National Technology Day by showcasing the technologies developed on Social Media** through FB and Twitter, talks, conferences and exhibition at the respective institutes.

**Patents Update**

Patents Filed		Patents Granted		Patents Prosecuted	
India	Abroad	India	Abroad	India	Abroad
17	16	01	14	28	28

**CSIR Outreach Programs**

- **CSIR-CBRI** organized an awareness programme at Children’s Senior Academy, Roorkee on May 21, 2019 on the occasion of Anti-Terrorism Day 2019. It also celebrated World Telecommunication and Information



Society Day 2019 at Sri Sanatan Dharam Prakash Chand Girls Inter College, Roorkee and World Metrology Day 2019 at Arya Kanya Pathshala Inter College, Roorkee. As part of Swachh Bhawishya & Swachh Pratispardha during Swachhta Pakhwada, Students of SSDPC Girls Inter College, Arya Kanya Pathshala Inter College & CBRI Junior High School along with their teachers participated in programmes at CSIR-CBRI. CSIR-CBRI Scientists motivated students & awarded meritorious students during Prayer Meet at Kendriya Vidyalaya No. 1, Roorkee. **About 1500 students & 80 teachers participated in meet.** 133 students belonging to classes VIII, IX and X of GreenFields Public School visited

- Kendriya Vidyalaya Students visited to **CSIR-AMPRI** Bhopal for Summer Vacation Programmes.
- **CSIR-CCMB** organized a bench to bedside program for two weeks to medical doctors. The medical students interacted with researchers and do hands on experiments to appreciate research in life sciences better.
- B.E. students and faculty members from Department of Civil Engineering, S R Engineering College, Warangal visited **CSIR-NEERI** and visited laboratories and facilities of the Institute.
- **CSIR-NISCAIR**, organized a Science Communication outreach program to highlight the activities of the Institute

## Research Highlights

- In a boost to efforts on '**waste to wealth**' generation, researchers at **CSIR-NEIST Jorhat**, report that they have succeeded in converting air pollutants turn into nanodiamonds that are essentially bits of crystalline carbon, hundreds of thousands of times smaller than a grain of sand. Carbon nanoparticles are important due to their medical applications such as drug delivery, biosensing, and biomedical imaging. CSIR-NEIST is a partner institute in India's National Carbonaceous Aerosols Programme- Carbonaceous Aerosol Emissions, Source Apportionment and Climate Impacts (NCAP-COALESCE) programme launched in 2017 which aims to address scientific complexities related to carbonaceous aerosols, focussing on issues underlying their origin and fate, and their role as drivers of regional climate change, over India. This research runs in parallel to India's NCAP-COALESCE
- **CSIR-NIIST** has developed a composite material that can absorb electromagnetic radiation. The rising level of electromagnetic radiation emitted by communication devices and electronic instruments is becoming a cause of concern.
- **CSIR-CCMB** team finds novel method to check infection in rice plants by altering certain class of proteins. Their work on molecular understanding of bacterial attack on rice plants, opens up newer ways of tackling plant infections by *Xanthomonas oryzae* pv. *oryzae* which causes a bacterial blight infection in rice because of which farmers may lose up to 60% of their crop.

- **CSIR-NCL** has identified new aromatic mosquito repelling molecule that promises to help repel and kill adult female of *Aedes aegypti* mosquito which is a carrier of several disease-causing viruses
- **CSIR-IICT** scientists have identified a new biomaterial that can help prevent the risk of developing microbial infections on medical implants like urethral catheters, which is a major source of anti microbial resistance bugs.
- **CSIR-IMTECH** has developed a rapid and sensitive colorimetric detection of pathogens based on silver–urease interactions, which is a facile and economic approach for colorimetric detection of microbial pathogens in drinking water. **CSIR- IMTECH** researchers have isolated a **novel compound** from soil bacterium that shows promise in killing bacteria that are resistant to colistin the last resort antibiotic today. The effectiveness of the compound was tested on animal models.
- **CSIR-IICB** has synthesized 25 quinoline derivative compounds and tested in the lab by IACS team, show potent anticancer activity and have filed a patent in India. IICB jointly with IACS has already **filed a patent** in India. **IIT Bombay and CSIR-NCL** have designed hybrid nanoparticles, made of gold and lipids, to treat cancer

#### Memorandum of Understanding (MoU)

- **CSIR-IMTECH** Chandigarh, signed MoU with the **Institute of Liver and Biliary Sciences (ILBS), New Delhi**, for developing alternative microbial approaches to the currently used treatments for patients affected with severe alcoholic hepatitis (SAH). They will collaborate for “microbiome research” and perform clinical trials on patients affected with the SAH. The aim is to explore the possibility of formulating minimal microbial consortia from healthy human poop, which can be administered easily for treating the SAH and other liver-related ailments.
- **CSIR-IITR** signed MOUs with **AIIMS Bhopal, Dr. A.P.J. Abdul Kalam Technical University (AKTU), Lucknow, and University of Lucknow** for collaborative research and joint skill development programmes
- **The University of Jammu** and the **CSIR- IMTECH**, Chandigarh, have signed a MoU for research collaboration to conduct joint research projects in medicinal chemistry, material science, molecular biology and bioinformatics disciplines.
- **CSIR-IMTECH** signed MoU with **Sree Chitra Tirunal Institute for Medical Sciences and Technology**, to enhance the microbial culture collection at CSIR-IMTECH and use its current supply chain for providing the clinical strains obtained from them.

#### DSIR Achievements and Major activities

DSIR’s mandate is to promote industrial R&D besides technology promotion, development and utilization. Industrial R&D Promotion Programme of the department provides recognition and registration to in-house R&D units of industries, not for profit Scientific and Industrial Research Organizations (SIROs)



and Public Funded Research Institutions (PFRIs), by virtue of which these organizations are able to obtain customs and other tax exemptions, including weighted tax exemptions. This scheme helps in encouraging industrial R&D in the country.

- **Recognition/Registration and Renewal of R&D Units**

Organization/s	No. of applications evaluated	New Recognition	New Registration	Renewal of Registration	Renewal of Recognition
Industry R&D Units	165	16*	16*	81^	81^
SIROs (Not for Profit)	32	-	-	6	10
PFRIs (Universities & Institutes)	26	-	-	5	-

\*Same units were granted recognition and registration

^ Same units were granted renewal both recognition and registration

## **PUBLIC SECTOR ENTERPRISES**

### **1. Central Electronics Limited (CEL)**

CEL is an enterprise under DSIR having an objective to commercially exploit the indigenous technologies developed by National Labs and R&D institutions in the country. CEL has developed a number of products for the first time in the country through its own R&D efforts and it continues to emphasize its leading role in the area of solar photovoltaic systems, electronic gadgets for Railway and other strategic electronic equipment/components among others.

- The company manufactured electronic components/systems/SPV products worth Rs. 1023.10 Lakhs during the month.
- Sale of items worth Rs. 1529.38 Lakhs was realized in the month.

### **2. National Research Development Corporation (NRDC)**

NRDC continues to lay emphasis on broadening and strengthening the technology resource base by nurturing long term relationships with R&D institutions as well as universities, technical organizations, industries and also individual inventors.

- NRDC has licensed two technologies and collected a premia of Rs. 25.00 Lakh from licensing of technologies during the month.

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