No. DSIR/MS/2020/05
Government of India
Ministry of Science & Technology
Department of Scientific & Industrial Research
MONTHLY SUMMARY FOR THE CABINET
(May 2020)
(Part-I Unclassified)

Major achievements during the month of May 2020:

1. Council of Scientific & Industrial Research (CSIR)

Key contributions and Activities of CSIR

Given the Covid19 pandemic the month of May was centered on the efforts towards its mitigation. The efforts initiated in March, which continued through April, were accelerated in May and CSIR came up with several technologies and innovations aimed at mitigating the rapid spread in the country. CSIR scientists, students and staff, exhibiting great dedication worked tirelessly even with the prevailing conditions of lockdown and growing infections. CSIR worked on multiple fronts ranging from setting up testing of patient samples to development of novel diagnostics, drugs, vaccines and hospital devices and PPEs and other initiatives.

CSIR's strategy evolved in March to address the Covid19 comprehensively through the following 5-verticals made considerable progressed in May 2020:

- Digital and Molecular Surveillance;
- Rapid and Economical Diagnostics;
- Repurposed/New Drugs and Vaccines;
- Hospital Assistive Devices and PPEs,
- Supply Chain and Logistics.

All CSIR labs are contributing to these verticals and CSIR is actively engaged in identifying suitable Industry and PSU partnerships for each and every vertical such that the products and technologies developed are readily scaled up and deployed in the country. CSIR is also working in close synergy with other ministries and departments and state governments in the mitigation of the Covid19 outbreak.

Digital and Molecular Surveillance

The objective with which this vertical was set up was to assist the tracking and tracing of patients and people at risk of infections such that the infection spread can be limited at the earliest and prevented. This vertical also aims at understanding the viral genomes, their origin and prevalence along with their mutations spectrum. This would aid in the development of vaccines, diagnostics and drugs that are most suited for the Indian population.

Digital surveillance: The focus has been to integrate digital data on the virus such as the viral genome, with deep patient data and disease course data including outcomes.

- A key challenge in the Covid19 strategy is to help understand the risk from Asymptomatics and devise a reliable and efficient strategy to identify and manage them. To address this CSIR tested a digital surveillance strategy and initiated a pilot study in Kolar. In the pilot study, towards random samples that included healthcare workers were screened by a mix of RT-PCR assays and rapid antibody test and ELISA by CSIR-Institute of Genomics and Integrative Biology (IGIB) in Kolar, Karnataka along with TATA Sons, THSTI and NIMHANS. The pilot study on community surveillance in Kolar has shown that a combined serology plus RT-PCR intelligent strategy, informed by virtual data is a valuable approach in digital surveillance and could be used as a model to be replicated.

- CSIR is working with Intel India and International Institute of Information Technology (IIIT), Hyderabad to help achieve faster and less expensive COVID-19 testing and coronavirus genome sequencing to understand the epidemiology and AI-based risk stratification for patients with comorbidities. As part of the initiative, Intel India is developing an end-to-end system that consists of multiple applications, testing devices, data collection/aggregation gateways, a data exchange SDK and an AI model-hub platform. CSIR constituent labs such as CSIR-IGIB, CSIR-CCMB, CSIR-IMTECH, CSIR-IIP, CSIR-CLRI and others will work with various hospitals and diagnostic chains in carrying out comprehensive diagnostics. IIIT-Hyderabad will develop risk stratification algorithms that can help in drug and vaccine discovery for long term preparedness to combat the epidemic.

- **Molecular Surveillance:** Large dataset of the sequencing of viral genomes in India is the need of the hour to understand the virus dynamics such as its spread & mutation frequency and the impact on the severity of the disease and implications for the vaccine, drug, and diagnostic development.

- While globally, from the time of identification of the Coronavirus strain (SARS-CoV-2) causing Covid-19, nearly 25,000 sequences have been reported, from India about >300 sequences are reported as on date. Of these sequences, 166 SARS-CoV-2 genome sequences have been submitted from CSIR-IGIB and NCDC and CSIR-CCMB. More than 200 more sequences have been completed and plan to sequence more to understand the molecular epidemiology.

- CSIR-IGIB has done sequence analysis of the existing Indian sequences (from CSIR and all other institutions in India) in the database to understand the genetic diversity of strains that cover 19 states and union territories and observed that there are six distinct clusters in the country. This will help in understanding the origin, spread and biology and also understand the differences in outcomes at virus and host levels.

- CSIR has developed a fully automated analysis of sequencing data (Illumina short reads) for viral genomes that are needed to convert from raw data to consensus sequences.

- As part of the endeavor towards Sample to Sequence goal, CSIR-IGIB is optimizing sequencing strategy using Nanopore Technology that can be used in a local setting. For this, it is using a combination of MinIT and MinION (Oxford

Nanopore Technologies, ONT) for potential deployment on-site. Significantly, CSIR has developed and integrated Live Analysis on the Nanopore sequencing platform. This is important for an informed decision on the number of reads required to cover the COVID-19 genome using ONT. It will help to sequence cost-effectively by integrating hours of sequencing required and re-use of the Nanopore flow cells.

- CSIR-ICMR MoU on clinical data collection and sharing: CSIR-IGIB and ICMR have entered into MoU for the 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. This MoU will pave the way for bigger government hospitals to join with CSIR.

- Three CSIR labs, CSIR-CCMB in Hyderabad, CSIR-IGIB in Delhi, and CSIR-IMTech Chandigarh have been designated as bio-repositories for SARS-CoV-2 viral samples. This will help in the development of indigenous diagnostics, therapeutics, and vaccines.

Rapid and Economical Diagnostics

Diagnosis is the first and foremost step in the battle against the outbreak and given India's huge population there is an urgent need for testing at scale. CSIR is deeply involved in the testing of human samples using the RT-PCR test and aid ICMR in scaling up the testing. More importantly, CSIR labs are located across the country and can cater to areas like J&K and North East among others. CSIR is also working towards novel diagnostic methods and optimizing existing ones to improve scale and efficiency.

- **Diagnostic Testing of Coronavirus Samples**: CSIR is deeply involved in the testing of human samples for the presence of coronavirus infection using the **RT-PCR test**. Several of its laboratories are engaged in the work. **15** CSIR labs across the country are testing/supporting State Governments/ready to test. **9** CSIR Labs are actively involved in testing and tests done so far: >25,000.

- Further, CSIR has facilitated >13,500 tests by extending support to State Governments. CSIR is also supporting diagnostic testing by training >150 persons in RT-PCR technology and handling of patient samples **3** CSIR labs are ready to join testing efforts Laboratories Supporting State Governments with RT-PCR machines are CSIR-CLRI, CSIR-NIIST, and CSIR-NIO. CSIR-CFTRI and CSIR-CLRI have contributed to testing 8544 in Mysuru, and 5000 tests in Chennai respectively till now by providing the State Government with RT-PCR machines.

- Shipping Container-based Diagnostic Labs**:** To increase the testing capacity in the country, along with HP, Shipping Container-based Diagnostic Labs (Self Contained, -ve pressure, TrueNat MicroPCR, etc.) have been developed and are being deployed in Delhi (2 nos) and Chennai (2 nos).

- **Developing new diagnostics:** CSIR's constituent Lab, CSIR-Institute of Genomics and Integrative Biology (CSIR-IGIB) based in Delhi, has developed a low cost COVID-19 diagnostic kit. Called Feluda, this is a paper-strip based

diagnostic tool that uses CRISPR/CAS gene-editing technology. CSIR-IGIB signed MoU with **TATA Sons** for Commercialization of this test. CSIR-IGIB and TATA Sons will work towards regulatory approval by ICMR and then further commercialization.

- CSIR-IIIM has partnered with **Reliance Industries Limited (RIL)** to develop and scale-up a new Reverse Transcriptase-Loop Mediated Isothermal Amplification (RT-LAMP) based COVID-19 diagnostic kit for which a formal MOU has also been signed between CSIR-IIIM, Jammu and RIL. The COVID-19 RT-LAMP test is a nucleic acid-based test carried out from nasal/throat swab samples from patients. The test recipe has been developed and successfully demonstrated using synthetic templates. It is a rapid (45-60 min), cost-effective and accurate test. It has been tested with a small number of patients' samples and validating the kit on more patient samples is planned and will be done together with RIL.

- **Large scale sample testing using Next Generation Sequencing (NGS):** Next-generation sequencing (NGS) allows for analyzing a large number of viral sequences from infected patients, presenting novel prospects for studying the structure of viral populations, and understanding virus evolution and epidemiology. Collaboration between CSIR and **Syngene** for Next Generation Sequencing (NGS) based sample pooling and testing that will cater to large scale screening. In this method, samples will be labeled with a unique barcode and they will be pooled & shipped to the sequencing facility where multiple pools will be combined and high throughput sequencing will be done – positive samples will be identified based on patient barcodes. The advantage is that there is no restriction of low occurrence areas and a large number of samples per sequencing: ~10,000 to 50,000.

- **Improvisation of diagnostic methodologies:** Intending to simplify the RT-PCR based diagnostic testing, CSIR-CCMB has developed a method without the first tedious step of RNA extraction. Sampling is through the dry swab method and has demonstrated 100% concordance with a normal RT-PCR test. It will save costly reagents and viral transport medium (VTM) and will be validated independently at CSIR-IMTECH and submitted for ICMR approval.

- **Pooled Sample Testing:** To further increase the pace and scope of testing, CSIR has developed a methodology for pooled sample testing. Diagnostic assays using qPCR 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.

- CSIR-CCMB has been pooling samples that belong to areas with lower than 2% COVID-19 prevalence rates for diagnostics using RT-PCR. The SOP for this strategy is now publicly available.

- **Nested PCR for efficient testing**: Nested polymerase chain reaction (Nested PCR) is a modification of PCR intended to reduce non-specific binding in products due to the amplification of unexpected primer binding sites. CSIR-

CCMB is working to develop nested PCR for use in sample testing as it is a more efficient method of testing.

Repurposed/New Drugs and Vaccines

CSIR is exploring all possible options ranging from repurposed drugs to new drugs to phytopharmaceuticals and AYUSH products and biological therapeutics including vaccines. CSIR has identified the top 25 drugs/drug candidates for repurposing based on the global therapeutic pipeline. Many CSIR labs across India such as CSIR-IICT, CSIR-CDRI, CSIR-NCL, CSIR-IICB, CSIR-IIIM, CSIR-NIIST, CSIR-NEIST and others are involved in this strategy. Based on the global therapeutic pipeline, CSIR has identified the top 25 drugs/drug candidates that have the potential to be beneficial in the treatment of Covid-19.

- **Repurposed Drugs:** CSIR-Indian Institute of Chemical Technology (IICT) has developed the synthetic process and API of Favipiravir a leading drug for Covid-19 which has been transferred to **Cipla**. Cipla has now been granted DCGI approval for phase 2 clinical trial of Favipiravir, paving way for launch of the drug in the country soon after completion of clinical trials.

- The synthetic process and Key starting materials of Remdesivir (Gilead) are being provided by CSIR-IICT to Cipla and other industries. Gilead has received emergency approval by FDA and Gilead has given voluntary license to few Indian industries.

- **Reducing import dependency of APIs and drug intermediates:** CSIR labs are also working to reduce dependency on APIs and drug intermediates from other countries. Given the worldwide lockdown and apprehending shortage of supplies, CSIR-NCL, CSIR-IICT and many CSIR labs are working towards self-sufficiency in the drug supply chain for India by developing indigenous processes and platform technology to produce important key starting materials (KSMs)/drug intermediates and active pharmaceutical ingredients (APIs) in the country.

- For Hydroxychloroquine two intermediates (especially hydroxyl novoldimine) critical for Hydroxychloroquine production are being imported from China. CSIR-IICT is developing the same and is in contact with four industries for production.

- CSIR-IICT is partnering with LAXAI Life Sciences to jointly develop and manufacture APIs and key intermediates which will decrease the dependency on imports .

- **Clinical trials of Mw:** CSIR and **Cadila Pharmaceuticals** have received regulatory approval for clinical trials to evaluate the efficacy of an existing gram-negative sepsis drug, called Sepisvac for COVID19 patients. Sepsivac has been clinically developed and approved for gram-negative sepsis, a severe infection. The drug is being tested in three different trials to combat Covid-19. The first trial is on critically ill Covid19 patients and **is being conducted in AIIMS-New Delhi, AIIMS-Bhopal and PGI, Chandigarh**. The other two trials are on Hospitalized (but not critically ill) Covid19 patients and High-Risk Contacts of Covid19.

Approval for these two trials also has been received and will be conducted after the trial on critically ill Covid19 patients.

- **Phytopharmaceutical Formulation**: AQCH, a formulation developed by CSIR, ICGEB (DBT) and **Sun Pharma** for dengue is being repositioned for coronavirus and Sun Pharma has received approval for phase 2 clinical trial from DCGI. This will add to the pipeline of drugs for the treatment of Covid-19 and is the first phytopharmaceutical to get approval for the clinical trial.

- **Traditional Medicine:** Hon'ble Health Minister Dr Harsh Vardhan and Hon'ble Minister of AYUSH Shri Shripad Yesso Naik launched clinical trials being done jointly by CSIR, ICMR and Ministry of Ayush. The three studies include: Studies on Ayurveda interventions as prophylaxis and as an add-on to standard care to COVID-19; Ayurvedic medicines such as Ashwagandha, Yashtimadhu, Guduchi Pippali, and a polyherbal formulation (Ayush-64) are being used in the clinical trials involving health workers and those working in COVID-19 high-risk areas. *Withania somnifera* (Ashwagandha) for prevention against SARS-CoV-2 in subjects with increased risk during the COVID 19 Pandemic - a comparison with Hydroxychloroquine in the health care providers.

- **Antibodies and Serology Approach:** CSIR through its NMITLI program has approved a project for the development of human monoclonal antibodies (hmAbs) that can neutralize SARS-CoV-2 in patients. The project would be implemented by a multi-institutional and multi-disciplinary team comprising NCCS, IIT-Indore, PredOmix Technologies, and Bharat Biotech International. The project aims to generate hmAbs to SARS-CoV-2 from the convalescent phase of COVID-19 patients and select high affinity and neutralizing antibodies. The project also aims to anticipate future adaptation of the virus and generate hmAbs clones that can neutralize the mutated virus and could be readily available for combating future SARS-CoV infections.

- CSIR-CCMB has entered into **MoU with the University of Hyderabad and Vins Bioproducts Ltd** to enable the development of antisera against SARS-CoV-using inactivated virus in horses which is amenable for large-scale production. Antisera is the blood serum containing antibodies which can be used for passive immunity.

- CSIR-CCMB has begun an industry collaboration under CSIR NMITLI program to produce COVID-19 vaccine using inactivated virus with Bharat Biotech.

- **Corona Viral Cultures and Cell lines for Screening Assays and Testing:** To take forward new drug discovery, a critical step is the establishment of viral cultures and assays for testing. The system is ready at CSIR-CCMB and testing of compounds for DRDO and others is in progress. CSIR-CCMB has entered into a collaboration with Eyestem Research Private Limited. The research team will use the human lung epithelial cell culture system provided by Eyestem as part of its anti-viral screening (ACS) platform. Eyestem's cell culture system expresses the ACE2 receptor and other genes which are essential determinants of viral input and replication.

- **New Drug Discovery:** The CSIR and AICTE with the support of the Principal Scientific Adviser of the Government of India have launched an initiative for in silico drug discovery for Covid-19 disease. It is a hackathon that involves students and researchers. The ideas holding potential that emerge from the hackathon will be developed by CSIR labs, startups and any other interested organization.

Hospital Assistive Devices and PPEs

Towards addressing the challenge of a severe shortage of ventilators and oxygen enrichment devices and personal protective equipment (PPEs) CSIR labs such as CSIR-NAL, CSIR-CMERI, CSIR-CECRI and CSIR-CSIO and other labs are working actively in the development of ventilators and PPEs. For the scale-up of these CSIR has tied up with PSUs such as BHEL and BEL and other industries.

- CSIR-National Aerospace Laboratories (CSIR-NAL) has developed **Bi-Level Positive Airway Pressure System (BiPAP) ventilator**, named SwasthVayu has been certified for safety and performance by NABL accredited agencies. It has been developed in a short time of 36 days and is non-invasive and can be used in makeshift hospitals, dispensaries and homes. It has undergone stringent biomedical tests. It is undergoing clinical trials and non-disclosure agreements have been signed with six MSMEs for commercialization of the technology.

- **Respiratory Assistance Intervention Device by CSIR-CSIO:** Functional testing of the developed prototype as per targeted specifications has been completed using a Ventilator calibrator and artificial test lung. Initial two rounds of validation have been completed in discussions with anaesthesiologist of GMCH, Chandigarh, and the final round of validation in progress. ToT under process in discussions with M/s. Forbes (India), Mumbai, and M/s. LM Healthcare, Panchkula

- **Oxygen Enrichment Unit by CSIR-NCL:** OEU is one of the critical needs of COVID-19 patients is the need to meet the oxygen requirements due to their lungs being compromised. Oxygen enrichment unit (OEUs) to increase the oxygen concentration from the ambient air of 21-22% to 38-40% have been developed by CSIR-NCL and Genrich Membranes, a start-up innovation venture. It produces enriched oxygen for patients in the home and hospital settings. It can lead to enhancement of oxygen levels up-to 40% and is automatic and has received certification and is undergoing clinical trials.

- CSIR-CMERI has **developed mobile indoor disinfection sprayer units** which can be used for cleaning and disinfecting pathogenic micro-organism effectively, especially in hospitals. The two variants of the indoor disinfection units are Battery Powered Disinfectant Sprayer (BPDS), and Pneumatically Operated Mobile Indoor Disinfection (POMID).

- **Electrostatic Disinfection Unit** has been developed by CSIR-CSIO and licensed to BHEL, Power Tech mining and Rite Water. It has been evaluated by several municipal corporations.

- **Personal Protective Coverall by CSIR-NAL:** CSIR-NAL has developed an indigenous PPE coverall given the shortage and the huge demand in the country. The PPE Coverall Certified to ASTM F1670/F1670M-08 (2014) by SITRA, Coimbatore. Production rights have been given to MAF Clothing, Bengaluru on a Non-Exclusive basis. NAL supplied 50,000 Coveralls to PSU, HLL Life Care, Trivandrum.

- **3-D Face Shield by CSIR-CECRI:** CSIR-CECRI has developed a 3-D printed face shield and is tying up with industry to scale up the mass production and has partnered with a company 3D Lycan, Bangalore for Face Shield. The face shield developed by CSIR-CECRI has been certified by CIPET.

- **Biopolymer Nanocoated Medical Grade Mask:** CSIR-NCL, Pune has developed a superior face mask that has better filtration efficiency than the available face masks in the market. The mask has been developed using patented bacterial nanocellulose technology along with nano-coating. The South India Textile Research Association (SITRA) has conducted tests on CSIR-NCL's sample face masks and has certified it. CSIR-NCL has licensed the biopolymer nano-coated technology to Pune-based MSME SETLAB INDIA. SETLAB plans to start production in the next few days with 5000 masks/day and will reach the target of one lakh masks per day.

- CSIR-CECRI's **tri-layered Face Mask** with antimicrobial and hydrophobic coating has received certification from SITRA. >3 lakhs have been supplied.

- The CSIR-CMERI's technologies on **indoor disinfection unit**, the Battery Powered Disinfectant Sprayer (BPDS) and its Portable Soap-cum-Water Dispenser was transferred to an SSI for promotion of their industrial production.

- Touch free hand washing dispensers have been developed by CSIR labs such as CSIR-IMMT, CSIR-NEERI, CSIR-CSIO, CSIR-CIMAP and CSIR-CMERI. The technology has been transferred to MSMEs and more than 100 have been supplied.

- CSIR-CIMAP transferred its **herbal sanitizer** (Hankool) technology to M/s Sai International Pvt. Ltd., Lucknow.

- **Makeshift Hospital:** CSIR-CBRI, Roorkee has made prototype make-shift hospital building. This design of the make-shift hospital is being implemented near Haridwar in Uttarakhand along with the State Government. A demonstration unit for COVID-19 related facility is also being set up by CSIR-CBRI for NDRF at their 8th Bn Station in Ghaziabad.

Supply Chain and Logistics

The aim of this vertical is to Develop and coordinate an IT platform: for visibility of demand and supply of required goods and services to tackle the COVID-19 crisis; Establish Regional Inventory Centers: Pre-emptive identification of supply chain issues in new launches of CSIR products (Devices, PPE, kits, drugs, vaccines etc) and

services (testing, training) for COVID-19 management and finally Establish best practices and synergies from other efforts (Rural Employment Generation, Food Security for marginalized sections, Epidemiological forecasting and Regulatory Standards Development).

- Offering **Regional Inventory Management Solutions** where required by the local government. The participating CSIR labs are geared up and ready with the infrastructure and identified teams to facilitate the regional demands. The network of teams located in different geographical regions has started collecting the regional demands of materials such as supplies for testing labs, PPEs, medical supplies, etc. The database of potential suppliers for quality products is under preparation which will regularly evolve based on the demands collected by the CSIR nodal teams. This platform will also showcase and make available the different CSIR products developed for the management of the Covid-19 pandemic. 11 CSIR national laboratories signed up for providing support for regional inventory. The SOP and Model MoU are ready. The details of CSIR national laboratories providing support under supply chain management to fight COVID-19 with complete contact details have been made available in the public domain.

- CSIR-Central Road Research Institute (CRRI) based in New Delhi has developed and launched **Kisan Sabha App** to connect farmers to supply chain and freight transportation management systems. This portal acts as a one-stop solution for farmers, transporters and other entities engaged in the agriculture Industry. CSIR-CRRI has also released guidelines for the commute with social distancing norms to help during the relaxation of lockdown.

- Following the successful launch of the Kisan Saba App, steps have been initiated to develop **Aarogyapath,** a National Healthcare Supply Chain Management System to address COVID-19 and similar pandemics. This platform will act as a single stop solution for all national healthcare needs. The Beta version of Aarogyapath launch is expected in June 2020.

- MoU with Sewa International neared concurrence and is expected to be executed shortly. CSIR has worked-out a strategy of showcasing various CSIR products related to COVID-19 at Regional Warehousing centers which are to start beginning June.

Patents Update

Patents Filed		Patents Granted		Patent Prosecutions	
India	Abroad*	India	Abroad*	India	Abroad
13	31	12	18	59	139

* Data reported to IPU during the said period and may increase later during national phase entries

Outreach Activities

In addition to the technologies and products being developed and various S&T based activities and interventions, CSIR labs are also engaged in fulfilling scientific social responsibility and have undertaken a wide variety of outreach programs during May 2020 which are listed.

Guidelines for the commute with social distancing norms: These were developed by CSIR-CRRI and were presented to Hon'ble Minister Dr Harsh Vardhan by Director-CRRI in presence of DG CSIR

Distribution of Sanitizers:

- CSIR-CECRI, Karaikudi automated certain processes in preparation of sanitizer with available in-house materials due to which 600 litres could be prepared in a single batch and many 100 ml bottles could be filled in quick time.
- Hand sanitizers were distributed by CSIR-CFTRI to Holdsworth Memorial Hospital, Mysore.
- CSIR-CLRI handed over 150 litres of hand sanitizers (64th batch) to Dr Hemalatha, City Medical Officer, Greater Chennai Corporation, to support the Chennai Corporation Employees and Hospital workers.
- CSIR-CECRI's PPE Materials (Hand Sanitizer & Handwash Solution) gifted to District Educational Officer and Chief Educational Officer to be used by the Teachers involved in Exam Papers Evaluation Camp at Karaikudi.
- Hand sanitizers distributed by CSIR-CFTRI for SBI Branch Staff in the Campus.
- Sanitizer prepared (as per WHO norms) by CSIR-NGRI is being handed over to Uppal (Hyderabad) Police and Task Force, L.B. Nagar (Hyderabad).
- CSIR-IMMT, Bhubaneswar handed over 20L of hand sanitizer to Special Task Force of Crime Branch Police, Odisha.
- CSIR-IMMT, Bhubaneswar provided four units of contactless automatic hand sanitizer dispenser and Intubation hood.
- CSIR-IMMT transferred technology to make sanitizer, lemon grass oil and liquid soap to Jigsan Mercantile Ltd.

Distribution of Masks:

- Venture-centre CSIR-NCL to donate 1 lakh face shield masks – every shield is equipped with OHP & MDF sheets, an elastic band & also comes with 3 additional sheets.
- CSIR-CMERI organized a Rural Entrepreneurship Outreach Programme, in collaboration with an NGO to impart training to several villagers on making masks. The objective is to create local entrepreneurs who can contribute to the National Health Mission during COVID-19.
- 43000+ facemasks with support to 200+ families by CSIR-CMERI
- CSIR-CECRI handed over PPE materials to Govt. Departments, Panchayat Offices and Service Sector in and around Karaikudi area.
- CSIR-CSMCRI membrane-based masks distributed to 'safai karmcharis' of Solid Waste Management Dept. under the Bhavnagar Municipal Corporation and Urban Health Centre, Kaliabid, Bhavnagar.

- CSIR-CSMCRI distributed face masks to the frontline medical community and their support services in Homeopathic College, Shree Vaccine Distributors, BHM Association, and private clinics of Dr Tejas Doshi and Dr Dhaval Solanki
- CSIR-CSMCRI has given 1200 membrane-based face masks to the Solid Waste Management Dept. of Bhavnagar Municipal Corporation. These masks will be distributed by BMC to its road sweepers and personnel deployed for operating the door-to-door household waste collection carts

Ready to Eat Food:

- CSIR-IMMT, Bhubaneswar delivered 10,000 packets of ready-to-eat food (Khichidi), liquid soap and sanitizer to Commissionerate Police, Bhubaneswar.
- CSIR-CIMFR staff club provided food to starving villagers – 740 meals (430 in day and 300 in night), in Dhanbad district.
- CSIR-IHBT, Palampur supplied ready-to-eat food boxes to the HP State Administration.
- CSIR-IIP employees along with "Ek Choti Se Rasoi" team distributed 350 homemade masks to the needy. The Institute has also been providing food to more than 300 poor people for almost one month.
- Food supplements from CSIR-CFTRI were distributed in Mandya to those affected by lockdown in association with Mandya Zilla Panchayat.
- CSIR-IMMT distributed of 200 food packets, 5k khichdi cans, 500 soap bars, formulation along with Pallishree Org to daily wage workers staying in 5 villages, Chandaka Dampada forest range, in presence of forest range officer.
- CSIR-CFTRI, Mysuru supplied one tonne each of high protein biscuits and high protein rusks to the SDM, Vasant Vihar, New Delhi for distribution to the people at the shelter homes managed by it. With this, the number of high protein biscuits and rusks supplied to the COVID affected migrant labourers rose to 17 tonnes. The CFTRI products were also sought after by other relief agencies.
- The Bangalore division of the India Posts bought and supplied one tonne of the high protein biscuits from CSIR-CFTRI to its field staff to help them cope up with the lockdown difficulties.
- CSIR-CIMFR Staff is serving day (430) and night (300) meals every day more for than a month.
- CSIR-IHBT Palampur, H.P., supplies Ready-to-Eat food to Bhubaneswar and CSIR-IMMT handed over the Ready-to-Eat food dal aloo chawal mix to the office of Asstt Labour Commissioner, Bhubaneswar for distribution to the migrants.

DEPARTMENTAL ACTIVITIES

DSIR's mandate is to promote Industrial Research and Development besides technology promotion, development and utilization. In order to promote and nurture Research and Development in the country, Industrial R&D Promotion Programme of the department gives recognition and registration to in-house R&D units of industries, not for profit Scientific and Industrial Research Organizations (SIROs) Public Funded Research Institutions (PFRIs) and periodically renews these recognition / registration under the respective Government Notifications (as amended from time to time), by virtue of which these organizations are able to obtain Customs duty exemptions, Goods & Service Tax (GST) concessions and Weighted tax deductions on R&D by Industry (us 35(2AB) of IT Act).This scheme helps in encouraging industrial R&D in the country.

Industrial R&D Promotion Programme
Recognition/ Registration and renewal of In-house R&D in Industry

- 18 in-house R&D units of industries were granted recognition as well as registration certificates.
- 70 in-house R&D units of industries were granted renewal of recognition as well as renewal of registration certificates.

Scientific and Industrial Research Organization (SIROs)
Recognition/ Registration and Renewal of SIROs

- 03 SIROs were granted recognition as well as registration certificates.
- 30 SIROs were granted renewal of recognition and 15 were granted renewal of registration certificates.

Public Funded Research Institution (PFRIs)
Registration and Renewal of PFRIs

- 06 PFRIs were granted renewal of registration certificates.

PUBLIC SECTOR ENTERPRISES

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.432.16 Lakhs during May, 2020.
- Sale of items worth Rs.651.93 Lakhs was realized during May, 2020.
- Major achievement during May, 2020 - Developed lab prototypes of piezo based low pressure sensor and flowmeter for medical ventilator applications.

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 been assigned 01 technology on 'Navrakshak PPE suits' by Innovation Cell of Institute of Naval Medicine, Mumbai. Navrakshak PPE suits' technology licensed to 03 companies such as M/s Greenfield Vintrade Pvt. Ltd Kolkata, M/s Vaishnavi Global Pvt Ltd, Mumbai and M/s Bharart Silks, Bengaluru during May, 2020.
- NRDC has collected premia of Rs 9.00 Lakh from licensing of technology during May, 2020.