I/8918/2022

E 38388 -Misc./MS/Cabinet/2022-CDN
Government of India
Ministry of Science and Technology
Department of Science and Technology
(CDN Section)
***

Technology Bhawan,
New Mehrauli Road
New Delhi-110016
Dated: 15.11.2022

OFFICE MEMORANDUM

Subject: Monthly Summary to the Cabinet for the month of October, 2022.

The undersigned is directed to enclose herewith a copy of the Monthly Summary of important policy decisions taken and major achievements of the Department of Science & Technology for the month ending 31.10.2022 for information.

2. This has already been approved by Secretary, DST.

(Anil Kumar Pandey)
Deputy Secretary to the Govt. of India

To,

All Members of the Council of Ministers

Copy with enclosures, forwarded to:-

i. Vice Chairman, NITI Aayog, NITI Bhawan, New Delhi. (vch-niti@gov.in)
ii. The Chairman, Union Public Service Commission (chairman-upsc@gov.in)
iii. Chief Executive Officer, NITIAayog, NITI Bhawan, New Delhi (ceo-niti@gov.in)
iv. The Principal Secretary to the Prime Minister, Prime Minister Office, South Block, ND (pkmishra.pmo@gov.in)
v. All members of NITI Aayog, NITI Bhawan, New Delhi. (vk.saraswat@nic.in, rc. niti@gov.in, vinodk.paul@gov.in)
vi. Secretary to the President of India. (secy.president@rb.nic.in)
vii. Secretary to the Vice-President of India. (secyvp@nic.in)
viii. Principal Scientific Advisor to the Govt. of India. (vijayraghavan@gov.in)
ix. All Secretaries to the Government of India (secy-goi@lsmgr.nic.in)
x. The Principal Director General, Press Information Bureau, Ministry

I/8918/2022

of Information and Broadcasting. (pdg-pib@nic.in)
xi. The Director, Cabinet Secretariat, New Delhi. (cabinet@nic.in)
xii. Dr. Rabindra Kumar Panigrahy, Sc. 'E', DST for uploading the Monthly Summary on DST's website. (rabindra.p@gov.in)
xiii. PSO to Secretary, DST. (anuj.tripathi@nic.in)
xiv. AD (OL), DST for Hindi Translation (kn.singh65@gov.in)

Signed by Anil Kumar Pandey
Date: 15-11-2022 15:40:33
Reason: Approved

Department of Science & Technology
Monthly Report
October, 2022

I. Important policy decisions taken and major achievements during the month:

A. Science for Society

1. A Partial Solar Eclipse occurred on 25 October, 2022 which was visible from most parts of India. An informative article on solar eclipses by a scientist at Aryabhatta Research Institute of Observational Sciences (ARIES), Nainital was published in local press media on the previous day. On the day of the eclipse, an online popular talk on solar eclipses and live streaming of the partial eclipse were conducted by ARIES for wider outreach. Arrangements were also made for local media and 50+ public visitors at ARIES to safely watch the eclipse.

2. International Advanced Research Centre for Powder Metallurgy and New Materials (ARCI), organized a workshop on "Hydrogen: Shades and Applications", at Chennai.

3. National Innovation Foundation (NIF), Ahmedabad facilitated granting of two patents to grassroot innovators. Device to ascend and descend a vertical structure and Arecanut peeler.

4. The on-farm field trials cum demonstrations of 5 crop varieties viz. Kudrat 5 & 9 (wheat), Surjeet Basmati-1 (rice), Sitara Sringar (Mustard), Kashi No. 1 (onion) were conducted by NIF at 172 farmers field in Sultanpur district of Uttar Pradesh wherein all varieties performed well and are being adopted by the farmers for profitable cultivation.

5. The on-site evaluation of an innovative grafting technique 'Multiroot Nutmeg Sapling' was carried out at ICAR-Indian Institute of Spice Research, Kozhikode (Kerala) by NIF and it helps to improve drought tolerance with anchorage nutmeg plants.

6. An Inspire Lecture on 'Chemistry for Health' was organized by the NASI-Mumbai Chapter for the science students & researchers. A three-day conference on 'Material and Sustainable Developments' was organized by the NASI-Nagpur Chapter at Nagpur.

7. The first training workshop for astro-tourism for 24 selected villagers from around Hanle was conducted by Indian Institute Astrophysics (IIA), Bangalore. This was a week-long

program with classroom talk and hands-on sessions on using telescopes and night sky watching, and was extremely successful.

8. Vigyan Prasar (VP), New Delhi published Dream 2047 in Hindi & English separately, Gaash in Kashmiri, Tajassus in Urdu, Jigyasa in Punjabi, Jignyasa in Gujarati, Vigyan Vishwa in Marathi, Kutuhalli in Karnataka, Ariviyal Palagai in Tamil, Vigyan Vaani in Telugu, Bigyan Katha in Bengali, Xandhan in Assamese and Vigyan Ratnakar in Maithili. VP continued to produce and bring to its OTT (INDIASCIENCE) audience another set of 10 new popular science films taking the tally of films produced past the 4000 mark. Vigyan Prasar continued to enhance the number of pages at VIGYAN VAIBHAV (the ISTI portal) to past 100,000 pages of content.

9. The Division of Pediatric Cardiology of Sree Chitra Tirunal Institute for Medical Sciences and Technology, (SCTIMST), Trivandrum launched a webinar series in Pediatric Cardiology titled "Problem solving in Pediatric Cardiology" under the behest of Pediatric Cardiology and Pulmonary Hypertension Society (PPHS).

10. World Health Organization (WHO) has initiated a programme to identify Covid19 technologies that have high impact in controlling the pandemic called Covid19 Technology Access Pool (C-TAP). The C-TAP secretariat has approached SCTIMST to assess and include the technologies developed by the Institute in the scheme so that it can be showcased to the world. This will help in wider technology transfer to countries which are initiating and encouraging startups.

B. Technology Development

1. Centre for Nano and Soft Matter Sciences (CeNS), Bangalore researchers have developed a cost-effective dual-functional polymeric electrochromic device using hybrid transparent electrodes that promises to replace the traditional ITO-based smart windows in modern infrastructures and automobile industries. The electrochromic device exhibits an excellent optical contrast of 57% between the coloured and the transparent states with a rapid switching ability (response time 5 s) and outstanding cycling stability (>500 cycles). Additionally, the energy storage capability (areal capacitance 8 mF/cm2) of the device confirms the dual-functionality, enabling its dark state to power a timer display for 20 min.

2. Indian Patent on the process of Electroless Nickel/Nickel Phosphide (EN) Deposition on Graphite Substrates was granted to International Advanced Research Centre for Powder Metallurgy and New Materials (ARCI), Hyderabad.

3. In a sponsored project, ARCI developed Mg-Zn-Zr Alloy by vacuum induction melting and characterized for phase, microstructure and mechanical and corrosion properties. Improvement in mechanical properties and corrosion properties was observed with Zr addition. (IGSTC sponsored project).

4. ARCI produced pure spherical Fe-Al (Zr) powders in 3 batches (nearly 20 kg) by inert gas atomization.

5. ARCI fabricated 18650 Li-ion cells – {cylindrical (27 Nos.)} and pouch (4 Nos.) using ARCI's indigenous carbon-coated LiFePO4 cathode material. These are undergoing third party validation at the Li-ion pilot plant facility at IIT Bombay, Mumbai.

C. International Cooperation

1. India-Sweden Innovation Day 2022: Hon'ble Minister of Science & Technology and Earth Science, Government of India Dr Jitendra Singh and H.E. Ebba Busch, Hon Minister for Energy, Business and Industry, and Deputy Prime Minister inaugurated the 9th edition of the India Sweden Innovation Day in Stockholm on October 27, 2022.

The Hon'ble Minister highlighted how the India-Sweden partnership sets the framework for future cooperation to jointly tackle societal challenges including innovation-driven challenges on cross-sectoral issues with multi-stakeholders participation. The India-Sweden Innovation Partnership bridges institutions, R&D-intensive industries and creative entrepreneurs to address global challenges in line with the UN Sustainable Development Goals. The hon'ble Minister showed his confidence in the new Sweden government and hopes to further grow this relationship stronger than ever.

1200+ participants were part of the 9th India Sweden Innovation Day in Stockholm, 350 in person and over 900 digitally from all over the world.

2. Indo-Swiss Joint Committee Meeting on Science & Technology: The 6th Indo-Swiss Joint Committee Meeting on Science & Technology was held at Technology Bhavan, New Delhi on October 4, 2022. Dr S. Chandrasekhar, Secretary, Department of Science and

Technology (DST) and Mr Guy Parmelin, Hon'ble Federal Councillor (Minister), Head of the Swiss Federal Department of Economic Affairs, Education and Research jointly inaugurated the Joint Committee meeting and strongly desired to strengthen cooperation between two countries in the field of Science and Technology.

3. **India- Norway Joint Working Group meeting:** The India-Norway Joint Working Group on S&T discussed the extension of S&T co-operation between the two countries to include areas like quantum science and technology, electric mobility, green hydrogen, ocean science, cyber-physical system, blue economy, information and communication technology and strengthening existing areas of co-operation like polar sciences, bio-economy, renewable energy, nano-science and technology and anti-microbial resistance, at a meeting held on October 12, 2022.

   The meeting decided on furthering activities like bilateral workshops, support for on-going joint research projects, new joint R & D Project call with industry participation, human capacity development, focusing on areas which have more relevance or impact to society as well as industrial R & D programmes.

4. **Announcement of Indo-German R&D projects Result:** The results of the call 2021 between the Department of Science & Technology, India, and the German Academic Exchange Service (DAAD) under 'Project-based Personnel Exchange Programme'(PPP) were declared on 17th October 2022 and 21 proposals were jointly selected.

   Secretary, DST met with the German Research Foundation (DFG) delegation led by Dr Heide Ahrens, General Secretary (DFG) on 19th October 2022 on the success of 15 years of cooperation including the recent launching of the call on International Research Training Group (IRTG). Both sides discussed establishing cooperation in the Automobile, Renewal Energy such as Future Fuels, Hydrogen Technology (Ammonia, etc), Fossil Fuels and Clean Coal Technology.

5. **Women Involvement in Science and Engineering Research (WISER) programme of Indo-German Science and Technology Centre (IGSTC):** The first batch of awardees of the Women Involvement in Science and Engineering Research (WISER) programme of Indo-German Science and Technology Centre (IGSTC) were felicitated on 18th October 2022.

The ten (10) women researchers from India and one (1) from Germany holding regular/long-term research positions in academia, research institutions, or industry selected under the WISER-2022 programme will receive financial assistance to participate and collaborate in R&D & industry projects.

6. **BRICS:** BRICS Steering Committee meeting was held on 6th October 2022 for selecting the proposals received under BRICS 5th Call. Total 18 projects have been selected among BRICS countries, out of which India would support 11 projects.

7. Department of Science and Technology successfully hosted the **Second United Nations World Geospatial Information Congress (UNWGIC) on the theme "Geo-Enabling the Global Village: No one should be left behind"** at Hyderabad International Convention Centre (HICC), Hyderabad **from 10-14 October 2022**. The theme was in line with the vision of the Hon'ble PM ***Sabka Saath Sabka Vikas*** that forms the main focus of the Sustainable Development Goals of the UN. The event brought together stakeholders at the highest level from around the world to address and ensure that geospatial information has its widest and fullest utility in the service of social, economic, and environmental development. This event gave **an opportunity for India to showcase its Geo-Spatial Initiatives and achievements in recent years**.

D. <u>Human Capacity Building</u>

1. **Vigyan Jyoti:** DST has released first two editions of a quarterly e-news letter 'STEMPORIUM' under Vigyan Jyoti Prograrmme on 31st October 2022 in a virtual event. DST officers, NVS officials, IBM and AIF Team and nodal officers, principals of 200 JNVs have attended the event.

- 11 classes have been conducted on different topics of Physics, Chemistry, Biology and Mathematics in this month for class XII Vigyan Jyoti scholars. One test has also been conducted.
- Seven sessions of NTSE (Focused phase) organised for 337 selected Vigyan Jyoti Scholars of Phase III.
- Three sessions of PyCode was conducted on 11th, 18th and 28th October, 2022.
- Four Curriculum based STEM sessions (C-STEM) were organized on the topics *viz.* Metals and Non-Metals-1, Light- Reflection and Refraction, Light and the Colorful World, Electricity-1.
- Five Atal Tinkering Lab activities have been conducted by different JNVs.

- Thirteenvisits to Knowledge Partners have been conducted by different JNVs.
- Fourteen Role Model Sessions have been conducted by different JNVs.
- Four Science Camps have been organized by different JNVs.
- Orientation and Parent counselling sessions have been conducted by different JNVs.

2. **Cognitive Science Research Initiative:** Task Force (TF) meeting under Cognitive Science Research Initiative (CSRI) has been conducted on October 21, 2022 to evaluate new proposals submitted under the programme.

3. **INSPIRE Scholarship:**

- The call for inviting application under **INSPIRE Scholarship SHE-2022** has been **extended** till **30th November, 2022 (**earlier the application date was from 1st September 2022 to 31st October 2022**).**
- **1836 SHE Scholars** received their scholarship amounting to **₹13,42,80,000/-** for pursing **B.Sc./M.Sc. Degree course** in **basic and natural sciences (Direct Mode)**.
- **82 SHE Scholars** received their scholarship amounting to **₹49,20,000/-** for pursing **B.Sc./M.Sc. Degree course** in **basic and natural sciences (Institutional Mode)**.

4. **INSPIRE Fellowship:**

- Total **38** INSPIRE Fellows were upgraded from **Junior Research Fellow (JRF) to Senior Research Fellow (SRF)**.

5. **INSPIRE Faculty Fellowship:**

- To review the **performance of INSPIRE Faculty Fellows**, who have completed **two years of tenure** in the last two years, Division has constituted **Performance Review Committee in 8 subject areas**.

6. Technology Development Board participated in 'Green Energy Revolution' organized jointly by FITT, IIT Delhi and Anthronik on 19th October, 2022. The two-day workshop aimed at delivering concrete deliverable plans playing pivotal role towards India's Net Zero Emissions target by 2070.

7. Technology Development Board participated in the Global Artificial Intelligence Summit & Awards, 2022 on 07th October, 2022 at Vigyan Bhawan, Delhi. Secretary, Technology Development Board inaugurated the Global Artificial Intelligence Summit & Awards

organized by AICRA. The session was graced by Sh. Piyush Goyal, Hon'ble Minister of Textiles, Minister of Commerce and Industry and Minister of Consumer Affairs, Food and Public Distribution.

E. Scientific Research

1. One of the most important cereal crops cultivated in semi-arid and temperate regions of the globe, wheat, is one of the well-researched crops. The study conducted by Birbal Sahni Institute of Palaeosciences, (BSIP), Lucknow addresses one of the crucial aspects of the past wheat yield and linkage with paleoclimate from five districts of the U.P region (India). A positive and statistically significant correlation between wheat yield and previous year winter mean temperature is recorded. The analysis shows that the increase in winter temperature during the seedling and the late growth stage may result in maximum yield. This helps to understand both the crop management element and the wheat production constraint component in relation to climate. Teleconnections with elements that affect yield, such as oceanic and atmospheric circulation is also established by BSIP.

2. The study related to the maternal ancestry of Nepal populations is the first such study where researchers have analysed the mitochondrial DNA sequence of 999 individuals from different ethnic groups of Nepal, including Newar, Magar, Sherpa, Brahmin, Tharu, Tamang, and populations from Kathmandu and Eastern Nepal. In this collaborative study conducted by BSIP it was found that most Nepali populations have derived their maternal ancestry from the lowland populations than the highlanders. The results obtained from this study helped the researchers in filling several important gaps about the history and past demographic events that shaped the present Nepalese genetic diversity and the carriers of some mitochondrial lineages may have crossed the Himalayas into Nepal, most likely via Southeast Tibet, between 3.8 and 6 thousand years ago.

3. Asiatic acid (AA), an aglycone of pentacyclic triterpene glycoside, obtained from the leaves of Centella asiatica exerts anticancer effects by inhibiting cellular proliferation and inducing apoptosis in a wide range of carcino-genic distresses. AA-loaded poly lactic-co-glycolic acid (PLGA) NPs (AA-PLGA NPs) have been formulated at BI, which would increase the therapeutic effectiveness of AA in the treatment of breast cancer.

4. Salient features of research outcome of Wadia Institute of Himalayan Geology (WIHG), Dehradun include: (i) Established that the landslides and slope instability hot spots in Mussoorie and Nainital Townships (in UK state) have increased at the present climate

change scenario; (ii) Established that the present-day metamorphic pattern of the Higher Himalayan Crystalline Sequence is the result of both pre-Himalayan and Himalayan metamorphism and petrological investigation is suggested in distinguishing their signatures; (iii) Established the Abor magmatic rocks of eastern Himalaya are associated with two episodic events: magmatic activity of the eastern Gondwana assembly as the first event and subsequent Gondwana continental break-up as the second event; (iv) inferred that Chamoli region could be the location for future great earthquake based on (a) seismicity clustering, (b) presence of fluids, (c) low-stress drop values, and (d) changes in b-value in the region.

F. Scientific Infrastructure Building

1. **Fund for Improvement of S&T Infrastructure in Universities and Higher Educational Institutions (FIST) Program**: The Task-Force visit to Five FIST supported Departments at the University of Kashmir, Srinagar, was undertaken to review the status of implementation and progress of the respective FIST projects and found all the supported facilities are functioning well and using it optimum level.

2. **Synergistic Training program Utilizing the Scientific and Technological Infrastructure (STUTI):** Ten STUTI PMUs have identified several DST supported Department/Institutes which have conducted 15 training programs across the country that imparted training to over 600 researchers/students.

****