Year-End- Review of CSIR

For Prelims: Council of Scientific and Industrial Research (CSIR), Key Achievements

For Mains: Key Achievements of CSIR, Achievements of Indians in Science & Technology

Why in News?

Recently, the year-end-review of the **Council of Scientific & Industrial Research (CSIR)** under the Ministry of Science & Technology was released.

What are the Key Achievements of CSIR?

- **First-Ever Biofuel-Powered Flight:**
  - CSIR facilitated India's **First-Ever Biofuel-Powered Flight** paving the way for sustainable and alternative fuels when the first biofuel-powered **flight was flagged off from Dehradun to Delhi.**
    - The bio-aviation fuel was **produced indigenously by the CSIR-Indian Institute of Petroleum (IIP)** from Jatropha oil and was based on the patented technology of the institute.
- **Aroma Mission:**
  - CSIR launched the **CSIR-Aroma Mission** in 2016 which **seeks to bring about transformative change in the aroma sector** through interventions in agriculture, processing and product development for fuelling the growth of the aroma industry and **boosting rural employment.**
- **Indigenous Autoclave Technology:**
  - CSIR-National Aerospace Laboratories (NAL) has successfully developed **state-of-art Indigenous Autoclave Technology** for processing advanced lightweight composites that are **integral to modern-day civil and military airframes.**
- **Conversion of Plastic into Diesel:**
  - CSIR-IIP and GAIL (Petroleum Business Company) have **developed a technology that can convert 1 tonne of** plastic waste and other Polyolefin products **into 850 litres of the cleanest grade of** diesel.
- **Anaerobic Gas Lift Reactor (AGR):**
  - CSIR- Indian Institute of Chemical Technology (IICT) has developed and patented a **high-rate biomethanation technology known as AGR** for the generation of biogas and bio manure from organic solid waste like poultry litter, food waste, press mud, cattle manure, **Organic fraction of municipal solid waste (OFMSW),** sewage sludge etc.
- **RENEU Technology:**
  - CSIR- National Environmental Engineering Research Institute (NEERI) has **developed this technology for the construction of** wetlands that are sustainable wastewater treatment processes. Restoration of Nallah with Ecological Units (RENEU) was successfully implemented as a part of the **National Mission to keep the Ganges clean** for the pilgrims during the holy festival.
- **Drishti Transmissometer:**

- CSIR-NAL has developed and transferred the technology of **Drishti Transmissometer** that has been deployed in many airports in India. The transmissometer is a **visibility measuring system, useful for safe airport operations and landings.**

- **Head-Up Display:**
  - A transfer agreement for the manufacturing of a **new variant of** Head-Up Display (HUD) **for the** Tejas Fighter Aircraft **for commercial production** has been signed between CSIR-Central Scientific Instruments Organisation (CSIO), Chandigarh and Bharat Electronics Limited (BEL).
- **Bharatiya Nirdeshak Dravya:**
  - Bharatiya Nirdeshak Dravya (BND 420) **is India's first home-grown high purity gold reference standard** developed through a collaboration among the India Government Mint (IGM), **Bhabha Atomic Research Centre (BARC)**, CSIR-NPL and National Centre for Compositional Characterisation of Materials.
- **Shale Gas:**
  - CSIR-CIMFR has discovered shale gas **in two areas in the Gondwana basin in Central India and** Godavari **basin.** The total shale gas discovered so far in the country in these two basins is estimated to be about 63 trillion Cubic Feet (TCF).
    - It is **considered as one of the best sources of non-conventional** natural gas.
- **Portable Reading Machine (PRM):**
  - A reading device developed by CSIR-CSIO **helps the visually impaired by reading the text aloud.** The advanced reading machine named **"Divya Nayan"** is a stand-alone, PRM.
- **Dimethyl Ether:**
  - CSIR-NCL has set-up an indigenous process technology to create **Dimethyl Ether (DME)** from **methanol.**
    - DME is a **clean fuel with potential to replace diesel and will be a non-fossil additive to LPG gas.** This will also help the **Pradhan Mantri Ujjwala Yojana program**, by reducing LPG imports.
- **Earthquake Warning System:**
  - A **first-of-its-kind earthquake warning system** has been developed by CSIR-CSIO. The system **can sense tremors, record them and generate an SMS** to the concerned action points, in real-time.
- **Sindhu Sadhana:**
  - The first indigenously built research vessel **Sindhu Sadhana** to gather samples for **genome mapping of microorganisms in the** Indian Ocean.
    - To understand the biochemistry and the response of the ocean to **climate change**, nutrient stress and **increasing pollution.**
- **Green Crackers:**
  - CSIR-NEERI developed **Green Crackers in a bid to curb air pollution.** A green logo and QR coding system **were also launched to track manufacture & sale of counterfeit crackers.**
- **Heeng Cultivation:**
  - For the first time, CSIR- Institute of Himalayan Bioresource Technology (IHBT) introduced **asafoetida (Heeng) cultivation in the Indian Himalayan region.**
- **Kisan Sabha App:**
  - **Kisan Sabha App** has been developed by CSIR- Central Road Research Institute (CRRI) **to connect farmers to the supply chain and freight transportation management system.**
    - This portal acts as a **one-stop solution for farmers, transporters, and other entities** engaged in the **agriculture Industry.**
- **Ksheer Scanner:**
  - CSIR has developed a low-cost and portable **Ksheer Scanner, a technology to detect adulterated milk.**
- **Rice Variety:**
  - CSIR-Centre for Cellular and Molecular Biology (CCMB) in collaboration with the Indian Institute of Rice Research at Hyderabad has **released a new variety of rice that resists pests and is also beneficial for those with** diabetes.
    - The new Improved **Samba Masuri (ISM)** rice variety **is resistant to** Bacterial Blight (BB).
- **JIGYASA:**

- It is **one of the major initiatives taken up by CSIR at national level** to widen and deepen CSIR's **Scientific Social Responsibility (SSR)** by connecting school students to scientists at CSIR.

- **Purple Revolution:**
  - CSIR enabled the famed Purple Revolution **by introducing Lavender Cultivation in** J&K benefiting farming families. India from being one of the importers of Lemongrass essential oil a few years back, now **becomes one of the largest exporters in the world.**
    - Indigenous development of Tulip bulb production under the Floriculture mission **helped reduce the import of planting material.**
- **Gaon Ka Pani Gaon Mein:**
  - CSIR has led a Mission mode project for developing **Village Level Water Management (VLWM) Plans** for augmenting water resources in selected villages.
    - Mission on **High-Resolution Aquifer Mapping & Management in Arid Regions of North-Western India** has also been launched and implemented in association **with the Ministry of Jal Shakti under** Jal Jeevan Mission.
- **India's First Indigenously Developed Hydrogen Fuel Cell Bus:**
  - The bus uses hydrogen fuel cells and air to generate electricity for power and can run for 600 km without stopping. **The only emission from the bus is water, thus making it the most environment friendly mode of transportation.**
- **Traditional Knowledge Digital Library (TKDL):**
  - Recently, the Cabinet approved widening access of the TKDL database to users, besides patent offices, The opening up of the TKDL database to users **will drive research & development, and innovation based on India's valued heritage across diverse fields.**
- **Steel Slag Roads:**
  - CSIR developed the **steel slag valorisation technology to convert waste steel slag as road-making aggregates.** Processed steel slag aggregates as developed through waste steel slag have been successfully utilized in the construction of **India's First Steel Slag Road in Surat.**
- **Maiden Flight of HANSA NG:**
  - CSIR-NAL designed and developed **Hansa NG aircraft** which is an all composite two seat light trainer aircraft to be used as an ab-initio flying training aircraft for the flying clubs in India, with significant modifications on Hansa 3 aircraft to make it more useful as a trainer aircraft.
    - HANSA-NG **is an upgraded version of HANSA, which saw the first flight in 1993, and was certified in 2000.**
- **3D-Printed Patient-Specific Medical Implants:**
  - CSIR-CSIO developed a technology for manufacturing patient-specific medical implants **for several human body parts.** The technology has been transferred to industry **for commercial production and marketing of the product.**
- **Connect Global Indian Scientific Community on Digital Mode:**
  - CSIR has developed a virtual platform - **PRABHASS** (Pravasi Bharatiya Academic and Scientific Sampark) Portal **to connect with the global Indian S&T Diaspora** for jointly addressing societal challenges/ problems.
- **CSIR 'Skill India Initiative':**
  - This initiative **aims to equip young minds with the necessary technological skills through exposure to CSIR labs.** More than 2 lakh people have been trained under the initiative.

Source: PIB