Council of Scientific and Industrial Research

Council of Scientific and Industrial Research (CSIR) is the largest **research and development (R&D)** organisation in India. **CSIR has** a pan-India presence and has a dynamic network of **38 national laboratories, 39 outreach centres, 3 Innovation Complexes** and **5 units.**

- **Established:** September 1942
- **Located:** New Delhi
- **CSIR** is funded by the **Ministry of Science and Technology and it operates as an autonomous body** through the **Societies Registration Act, 1860.**
- CSIR covers a wide spectrum of streams – from **radio and space physics, oceanography, geophysics, chemicals, drugs, genomics, biotechnology and nanotechnology to mining, aeronautics, instrumentation, environmental engineering and information technology.**
    - It provides significant **technological intervention** in many areas with regard to **societal efforts** which include the **environment, health, drinking water, food, housing, energy, farm and non-farm sectors.**

Organisation Structure

- **President:** Prime Minister of India (Ex-officio)
- **Vice President:** Union Minister of Science and Technology (Ex-officio)
- **Governing Body:** The Director-General is the head of the governing body.
    - The other ex-officio member is the finance secretary (expenditures).
    - Other members' terms are of **three years.**
- **CSIR Advisory Board:** 15-member body composed of prominent members from respective fields of science and technology.
    - Its function is to provide science and technology inputs to the governing body.
    - Member **terms are are of three years.**

Objectives

- The objectives of the Council are **scientific and industrial/applied research of national importance.**
- **The activities include:**
    - **Promotion, guidance and coordination of scientific and industrial research** in India including the institution and the financing of specific researchers.
    - **Establishment and assistance to special institutions or departments of existing institutions for the scientific study** of problems affecting particular industries and trade.
    - Establishment and award of **research studentships and fellowships.**
    - **Utilization of the results of the research conducted** under the auspices of the Council towards the development of industries in the country.
        - Payment of a share of royalties arising out of the development of the results of

research to those who are considered as having contributed towards the pursuit of such research.
    - **Establishment, maintenance and management of laboratories, workshops, institutes and organisations** to further scientific and industrial research.
    - **Collection and dissemination of information** in regard not only to research but to industrial matters generally.
    - **Publication of scientific papers and a journal** of industrial research and development.

Vision & Strategy 2022

- **Vision:** Pursue science which strives for global impact, the technology that enables innovation-driven industry and nurtures trans-disciplinary leadership thereby **catalyzing inclusive economic development** for the people of India.

Awards

- **Shanti Swarup Bhatnagar (SSB) Prize for Science and Technology** is named after the founder Director of the **CSIR,** the late Dr Shanti Swarup Bhatnagar.
- It was instituted in 1957 as the most coveted and revered prize in the field of science and technology in the country.

Dr Shanti Swarup Bhatnagar

- He was the Founder Director (and later first Director-General) of **CSIR** who is credited with establishing twelve national laboratories.
- He played a significant role in the building of post-independent **Science and Technology** infrastructure and in the formulation of India's S & T policies. He concurrently held a number of important positions in the Government.
    - He was the first **Chairman** of the **University Grants Commission (UGC).**
- He was conferred with **Order of British Empire (OBE).** He was **Knighted in 1941** and elected **Fellow of the Royal Society, London in 1943.**
- He was awarded the **Padma Vibhushan in 1954** by the President of India.

Global Recognition

- **Scimago Institutions Rankings:** CSIR is recognized to be among the International leader in knowledge creation.
    - CSIR has been ranked **17th in the world amongst the government institutions** in the world according to the prestigious **Scimago Institutions Rankings 2019 Report.**
- **Intellectual Property:** Amongst its peers in publicly funded research organizations in the world, CSIR is a leader in terms of filing and securing patents worldwide.
    - CSIR is granted 90% of the US patents granted to any publicly funded Indian R&D organization.
    - On an average CSIR files about 200 Indian patents and 250 foreign patents per year. About 13.86% of CSIR patents are licensed - a number which is above the global average.

CSIR Key Achievements

- **Strategic Sector:**
    - **Drishti transmissometer:** It is an Indigenous - Innovative –Cost-effective visibility measuring system that provides information to pilots on visibility for safe landing & take-off

operations and is suitable for all airport categories.
    - **Head-Up-Display (HUD): CSIR-National Aerospace Laboratories (NAL)** made a significant contribution by developing indigenous Head-Up- display(HUD) for Indian **Light Combat Aircraft, Tejas.**
        - HUD aids the pilot in flying the aircraft and in critical flight manoeuvres including weapon aiming.
    - **Indigenous Gyrotron:** Design and development of indigenous gyrotron for nuclear fusion reactor have been accomplished.
        - A gyrotron is a **vacuum electronic device (VED)** capable to generate high-power, high-frequency THz radiation.
- **Energy & Environment:**
    - **Solar Tree:** It designed by **CSIR- The Central Mechanical Engineering Research Institute (CMERI)** lab in Durgapur. It occupies minimum space to produce clean power.
    - **Lithium-Ion Battery:** The **Central Electrochemical Research Institute (CECRI), Karaikudi in Tamil Nadu,** has set up the first indigenous Li-ion fabrication facility that has applications in defence, solar-powered devices, railways and other high-end usages.
- **Agriculture:**
    - **Medicinal and Aromatic Plants:** Enhanced cultivation of medicinal and aromatic plants in the country brought through the development of new varieties and agro-technologies.
    - **Samba Mahsuri Rice Variety:** CSIR in collaboration with ICAR developed an improved **bacterial blight resistant** Samba Mahsuri variety.
    - **Rice Cultivar (Muktashree) for Arsenic Contaminated Areas:** A rice variety has been developed which restricts assimilation of Arsenic within the permissible limit.
    - **White-fly resistant Cotton variety:** Developed a **transgenic cotton line** which is resistant to whiteflies.
- **Healthcare:**
    - **JD Vaccine for Farm Animals:** Vaccine developed and commercialized for Johne’s disease (JD) affecting Sheep, Goat, Cow and Buffalo so as to immunize them and increase milk & meat production.
    - **Plasma Gelsolin Diagnostic Kit for Premature Births, and Sepsis-related Deaths:** It is developed to diagnose premature birth and sepsis.
    - **GOMED:** A programme called **GOMED (Genomics and other omics technologies for Enabling Medical Decision)** has been developed by the CSIR which provides a platform of disease genomics to solve clinical problems.
- **Food & Nutrition:**
    - **Ksheer-scanner:** It is a new technological invention by **CSIR-Central Electronics Engineering Research Institute (CEERI)** to detect the level of milk adulteration and adulterants in 45 seconds at the cost of 10 paise, thereby putting adulterators in the milk trade in notice.
    - **Double-Fortified Salt:** Salt fortified with iodine and iron having improved properties developed and tested for addressing anaemia in people.
    - **Anti-obesity DAG Oil:** Oil enriched with **Diacylglycerol (DAG)** instead of conventional triacylglycerol (TAG) developed.
- **Water:**
    - **Aquifer Mapping of Water Scarce Areas: Heliborne transient electromagnetic and surface magnetic technique** based aquifer mapping carried out in six different geological locations in Rajasthan (2), Bihar, Karnataka, Maharashtra and Tamil Nadu.
    - **Understanding the Special Properties of the Ganga Water:** An assessment of water quality & sediment analysis of Ganga from different parts being done.
- **Waste to Wealth:**
    - **Non-toxic Radiation Shielding Material for X-ray Protection:** Non-toxic radiation

shielding materials utilizing industrial waste like red mud (from aluminium industries) and fly ash (Thermal Power Plants) developed which has been accredited by **Atomic Energy Regulatory Board (AERB)** for application in diagnostic X-Ray rooms.
    - **Waste Plastic to Fuel:** Process for conversion of waste plastics to gasoline/diesel or aromatics developed.
- **The Indelible Mark:** The Indelible ink used to mark the fingernail of a voter during elections is a time-tested gift of CSIR to the spirit of democracy.
    - Developed in 1952, it was first produced in-campus. Subsequently, the industry has been manufacturing the Ink. It is also exported to Sri Lanka, Indonesia, Turkey and other democracies.
- **Skill development:** CSIR is building a structured large scale Skill development Initiative using the state of the art infrastructure and human resources of CSIR.
    - About 30 High Tech Skill/Training programmes are being launched for imparting skills to over 5000 candidates annually.
    - **The skill development programmes cover the following areas:** Leather process Technology; Leather Footwear & Garments; Paints & coatings for corrosion protection; Electroplating & Metal Finishing; Lead Acid Battery maintenance; Glass Beaded Jewellery / Blue Pottery; Industrial Maintenance Engineering; Internet of Things (IoT); and Regulatory – Preclinical Toxicology.
- **Aviation:** The CSIR-National Aerospace Laboratories has designed a plane 'SARAS'.
    - In 2011, successfully tested India's 1st indigenous civilian aircraft, NAL NM5 made in association with National Aerospace Laboratories and Mahindra Aerospace.
- **Traditional Knowledge Digital Library:** CSIR has established the first-ever 'Traditional Knowledge Digital Library' **in the world.** It is accessible in five international languages(English, German, French, Japanese and Spanish).
    - CSIR successfully challenged the grant of patent in the USA for use of Haldi (turmeric) for wound healing and neem as an insecticide on the basis of traditional knowledge.
- **Genome sequencing:** CSIR has completed the sequencing of the Human Genome in 2009.

Some Important CSIR Labs

- CSIR-Advanced Materials and Processes Research Institute, **Bhopal**
- CSIR-Central Glass Ceramic Research Institute, **Kolkata**
- CSIR-Central Drug Research Institute, **Lucknow**
- CSIR-Centre for Cellular Molecular Biology, **Hyderabad**
- CSIR-Central Institute of Mining and Fuel Research, **Dhanbad**
- CSIR-Central Institute of Medicinal Aromatic Plants, **Lucknow**
- CSIR-Central Leather Research Institute, **Chennai**
- CSIR-Institute of Genomics and Integrative Biology, **Delhi**
- CSIR-Indian Institute of Integrative Medicine, **Jammu**
- CSIR-Indian Institute of Petroleum, **Dehradun**
- CSIR-National Aerospace Laboratories, **Bengaluru**
- CSIR-National Botanical Research Institute, **Lucknow**
- CSIR-Institute of Microbial Technology, **Chandigarh**
- CSIR-National Environmental Engineering Research Institute, **Nagpur**
- CSIR-National Institute of Oceanography, **Goa**
- CSIR-National Metallurgical Laboratory, **Jamshedpur**
- CSIR-National Physical Laboratory, **New Delhi**