



drishti

Council of Scientific and Industrial Research

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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 **Knighthed 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**