



**DSIR**

Department of Scientific and Industrial Research  
Ministry of Science and Technology  
Government of India



सीएसआईआर  
CSIR  
भारत का नवाचार इंजन  
*The Innovation Engine of India*



**APCTT**

Asian and Pacific Centre  
for Transfer of Technology

# 12<sup>th</sup> Asia Pacific Forum on Sustainable Development on “Advancing sustainable, inclusive, science- and evidence-based solutions for the 2030 Agenda and its SDGs for leaving no one behind”

**Side event on**

**“Fostering regional cooperation – building partnerships between  
scientific and research councils in the Asia Pacific region**

**Rama Swami Bansal**

Chief Scientist and Head

International S&T Affairs Directorate (ISTAD)

Council of Scientific and Industrial Research (CSIR), India



# CSIR Themes Aligned to SDGs and National Missions/Schemes

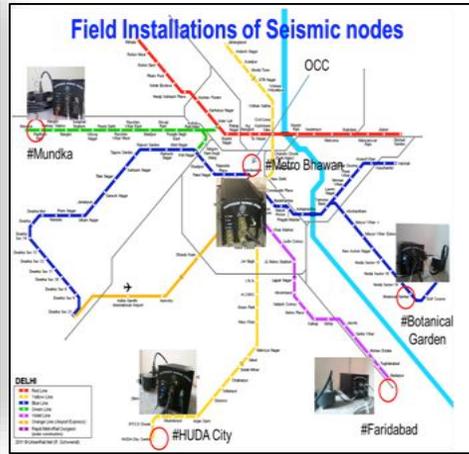
Thematic approach for integrating multi-disciplinary complementary talent & infrastructure to address unified goals of the country's through R&D



# Theme 01: Aerospace, Electronics, Instrumentation and Strategic Sector



**Drishti-Transmissometer-**  
A Runway Visibility Measuring System



**Instrumentation**



**Head up Display**



**HAPS**



**Q Plane**



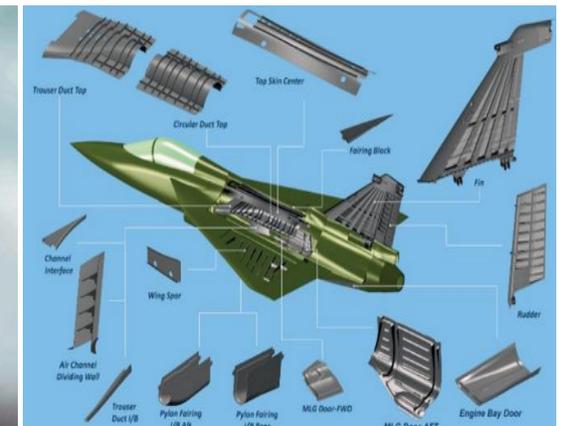
**Saras MK 2 Aircraft**



**Surface & Aerial Robotic Systems**



**Hansa 3(NG)**



**LCA-Tejas**

# Theme 02: Ecology, Environment, Earth & Ocean Sciences and Water



**Atmospheric Water Generator (1000 LPD) Demonstration Unit**



**Potash Fertilizer from Distillery Spent Wash**



**Municipal Solid Waste Disposal System**



**RV Sindhu Sadhana (80 m)**



**RV Sindhu Sankalp (56 m)**



**Autonomous vertical profiler (AVP)**



**CORAL REEF monitoring Robot**

# Theme 03: Civil, Infrastructure and Engineering



Steel Slag Road



Folded Textile Reinforced Concrete Fencing Panels for Highway



Eco-Friendly Burnt Clay Bricks



AUV 150, ROV 500 and AUV 500



Structural Configuration and Health Monitoring



Mechanised Drain Cleaning Systems



Sustainable Housing



Prima e- tractor

# Theme 04: Mining, Minerals, Metals and Materials



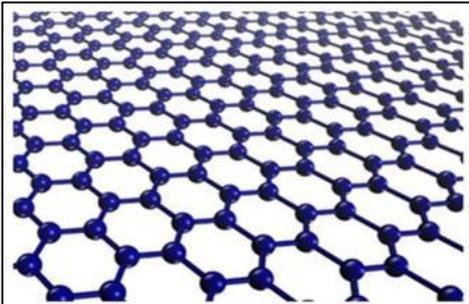
Mining



Coal compacting  
machine under operation



Completed soft coke plant



Graphene based materials for  
advancement supercapacitor



Production of pellet grade concentrate for  
iron & steel industries



H<sub>2</sub> Plasma Reactor for Steel



Making composite materials using Argo  
waste in a polymeric system

# Theme 05: Chemicals (including leather) and Petrochemicals



Azelaic acid Pilot plant



Hydrazine hydrate plant



Petroleum Units



Waterless Chrome Tanning Technology



Indian Footwear Sizing System



Leather thread and fabric



# Theme 06: Energy (Conventional & Non-Conventional) and Energy Devices



Fuel Cell Electric Vehicle (FCEV)

Bio - CNG

PEM electrolyzer



1000 Lithium-ion cells



Coal gasification pilot plant



Bio - Aviation Fuel



H2 powered ferry

# Theme 07: Agriculture, Nutrition & Biotech



Low chilling requiring APPLE (ANNA)



Purple Revolution



Menthol – Mint Production



Bio-pesticides for Fusarium wilt in crops

**FORTIFIED BANANA BAR** *cftri*



Ingredients : Banana pulp, sugar, vitamins and minerals

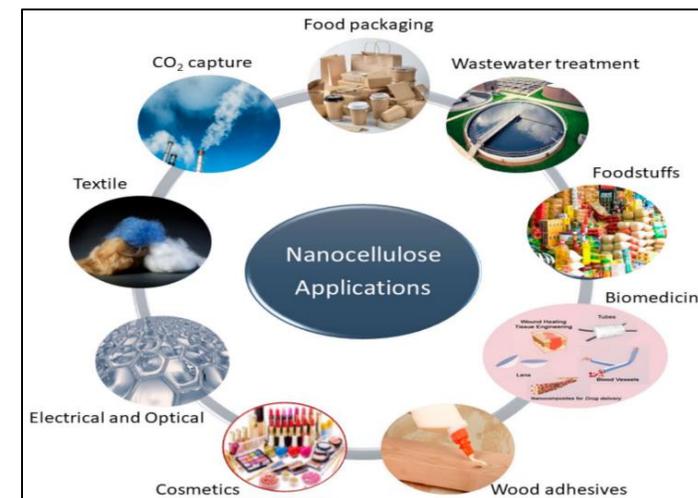
| Nutritional Facts | Per 100g | Per 20g |
|-------------------|----------|---------|
| Energy (K Cal)    | 210      | 42      |
| Carbohydrates (g) | 55       | 11      |
| Zn (mg)           | 15       | 3       |
| Fat (g)           | ND       | ND      |

Net Weight : 20g

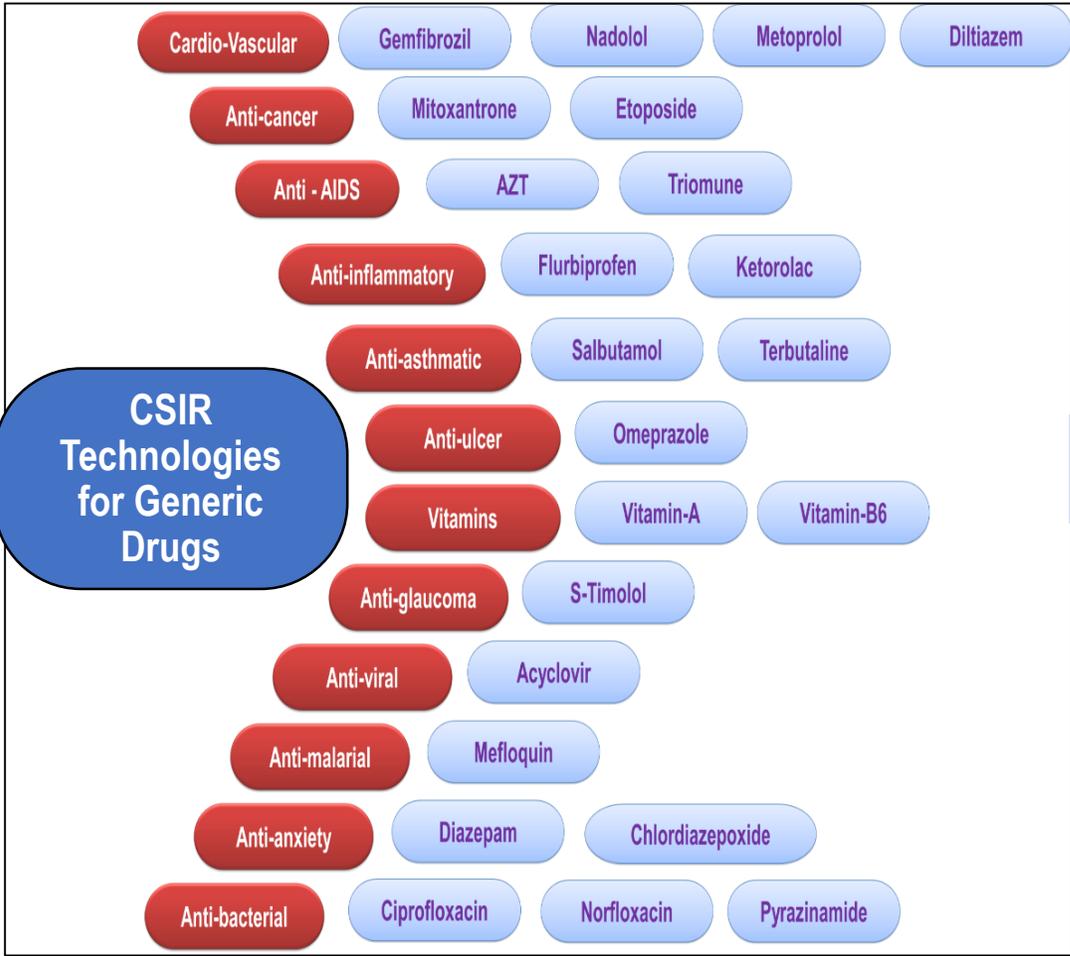
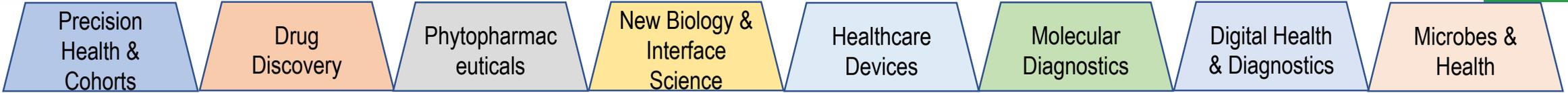
Best before three months from Date of manufacture



Floriculture Mission: Increasing shelf life



# Theme 08: Healthcare



CSIR - key contributor on Generic API molecule developments



Centchroman - World's first non-steroidal contraceptive pill

## Novel Drugs



Anti-malarial drug

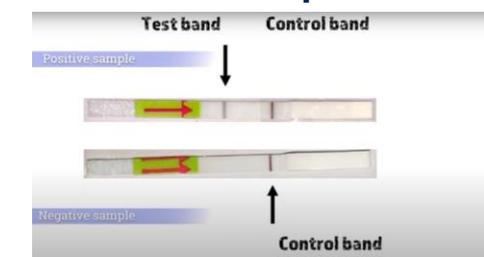


Management of post-menopausal osteoporosis

## Pandemics - Future Preparedness



Synthesis of small Molecules, Adjuvants and Lipids for Vaccine formulations (Covaxin)



FELUDA - FnCas9 based diagnostic kit

Phytopharmaceuticals/ AYUSH drugs

3 drugs have completed Phase II Trial and 1 drug is in ongoing Phase III trial.

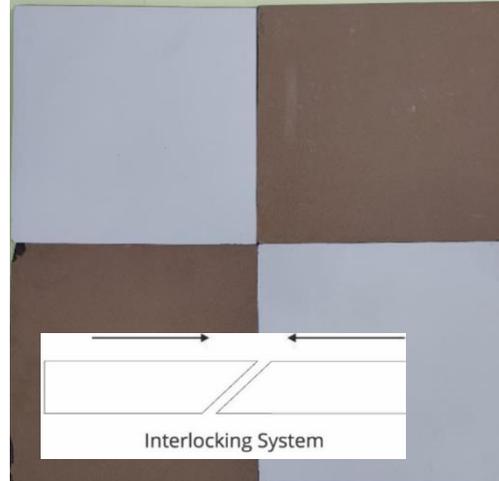
# Waste to wealth



Waste Plastic to Fuel



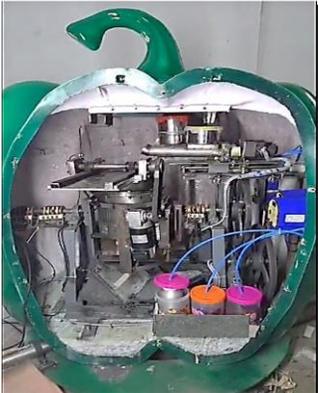
Waste Plastic Road Construction Technology



Lead Free X-ray Shielding Red Mud Tiles



India's first battery recycling pilot scale facility



Biomed. Waste ⇒ Disinfection ⇒ Solidification ⇒ Soil Additives

Biomedical Waste to Soil Additive



Building Products from Kota Stone Waste



# CSIR's Technology Incubation Centers – Boosting Start-Up Ecosystem

## Venture Centre

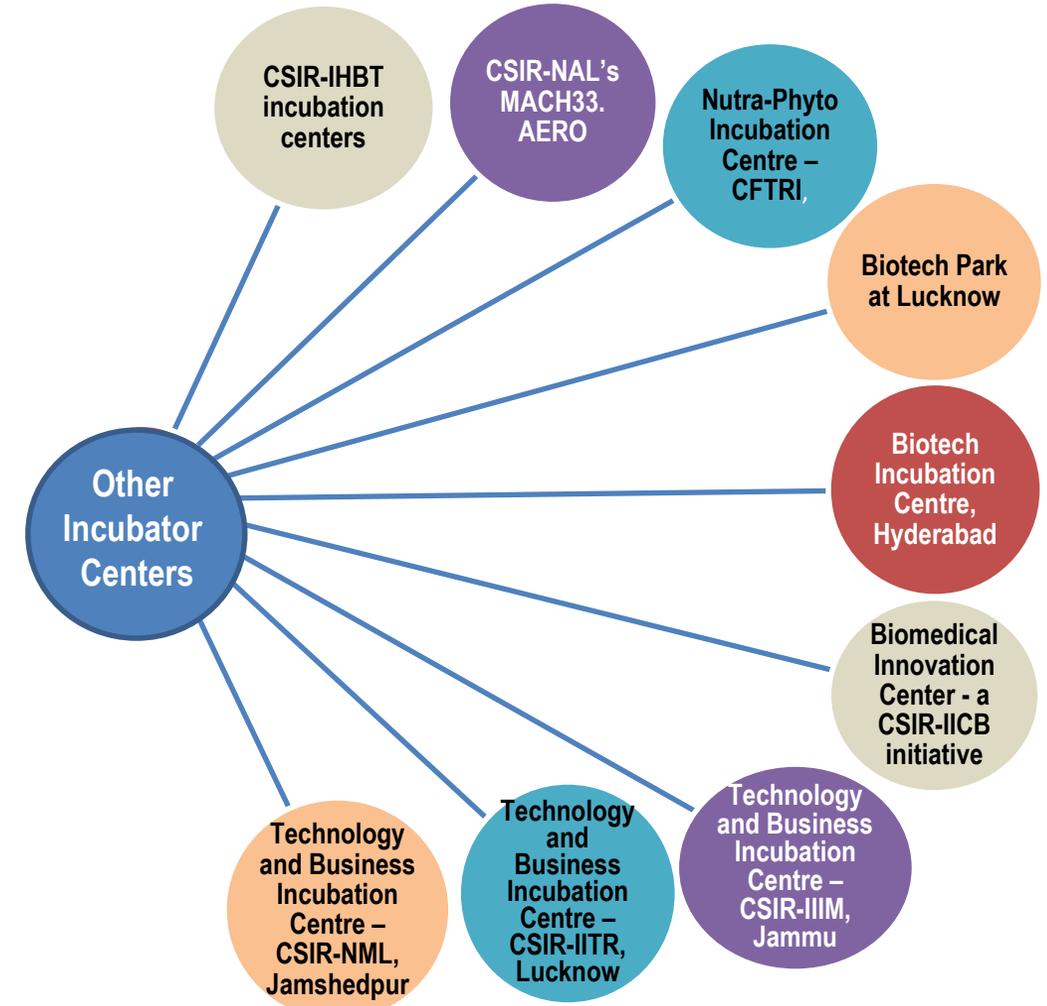


India's award winning, leading technology business incubator for science and technology startups

## Atal Incubation Centre



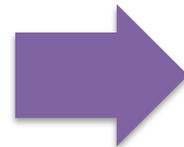
An ever-evolving ecosystem of start-ups and entrepreneurs to foster and support world class innovation



## Supporting Entrepreneurs and Promoting Start-ups

- **Launching** technologies in the market.
- **Handholding** startups / incubatees.
- **Creating** Jobs/livelihood
- **Supporting** Women Entrepreneurs and their Start-ups
- **Promoting** generation of IP

CSIR Innovation Complex-  
Mumbai (C-ICM)



A state-of-the-art innovation-cum-incubation facility with high-end scientific infrastructure & expertise, has been set up (inaugurated on 17 Jan 2025) to strengthen Business Development and Tech-Transfer activities of CSIR Labs, leveraging the unique opportunities offered by Mumbai

# Startups catalyzed by CSIR *(Indicative since 2014)*



## Other Startups catalyzed by CSIR

- Green Plant Nature
- Beyond Aromas Inc.
- The Bamboo Connection
- Shandil Plant Tech Pvt. Ltd.
- Aromatic Himalaya
- Ashveen Khatri
- The Fragrance
- Bob Organic
- Imalaya Aromatic Nursery
- Himachal Honey
- Umang Nutral Sweets
- Golden Herbal Products
- Himpine
- Him Pure
- Innovixa Health Products
- Rudra Shakti Herbs Pvt. Ltd.
- Himalyan Nutraceutical
- Himalya Nature Products
- Desvari Global Pharmaceuticals IIP
- Naani Spices and Foods
- Gayathri Extractors
- Winter Greens Pvt. Ltd
- Jho Jho Chikkis
- Sparkhil Traders & General Order Supplier
- Ritu Sales and Activation
- Asia Pacific Export
- Karma Bhatta Company
- Uiasravanthi Indothermal
- Technologies Pvt Ltd.
- Indian Plant Feeds
- Exergy Innovations Private Limited
- Supreme Bioscientific Pvt. Ltd.
- Smart Vest
- Venki Biodegradables Pvt. Ltd.
- Vir Natural Pvt. Ltd.
- Qudrat

**150+ Start-ups (since 2014) catalyzed by CSIR, highlighting the success stories across diverse sectors, such as agro-technologies, food products, medical instruments, and medicinal and aromatic products**



# Technologies and advanced services by CSIR

## Tech Showcase Portal

The screenshot shows the CSIR Tech Showcase Portal with the following statistics:

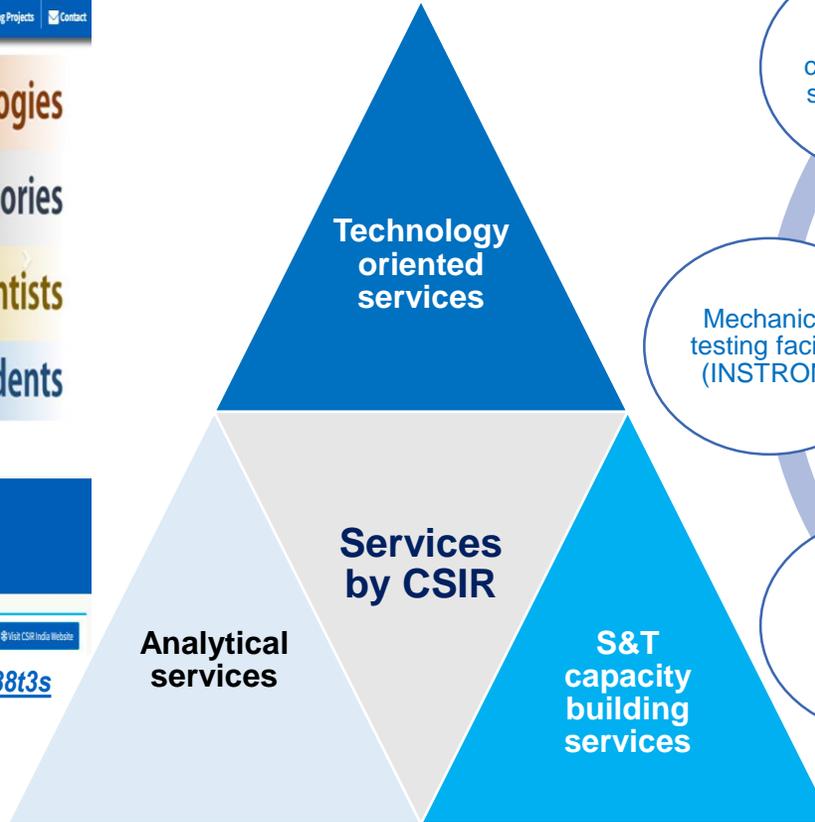
- 900+ Technologies
- 37 Laboratories
- 3000+ Scientists
- 1000s of Students

CSIR's Competence is highlighted with a gear icon and the text: "CSIR's research and development efforts are led by national goals".

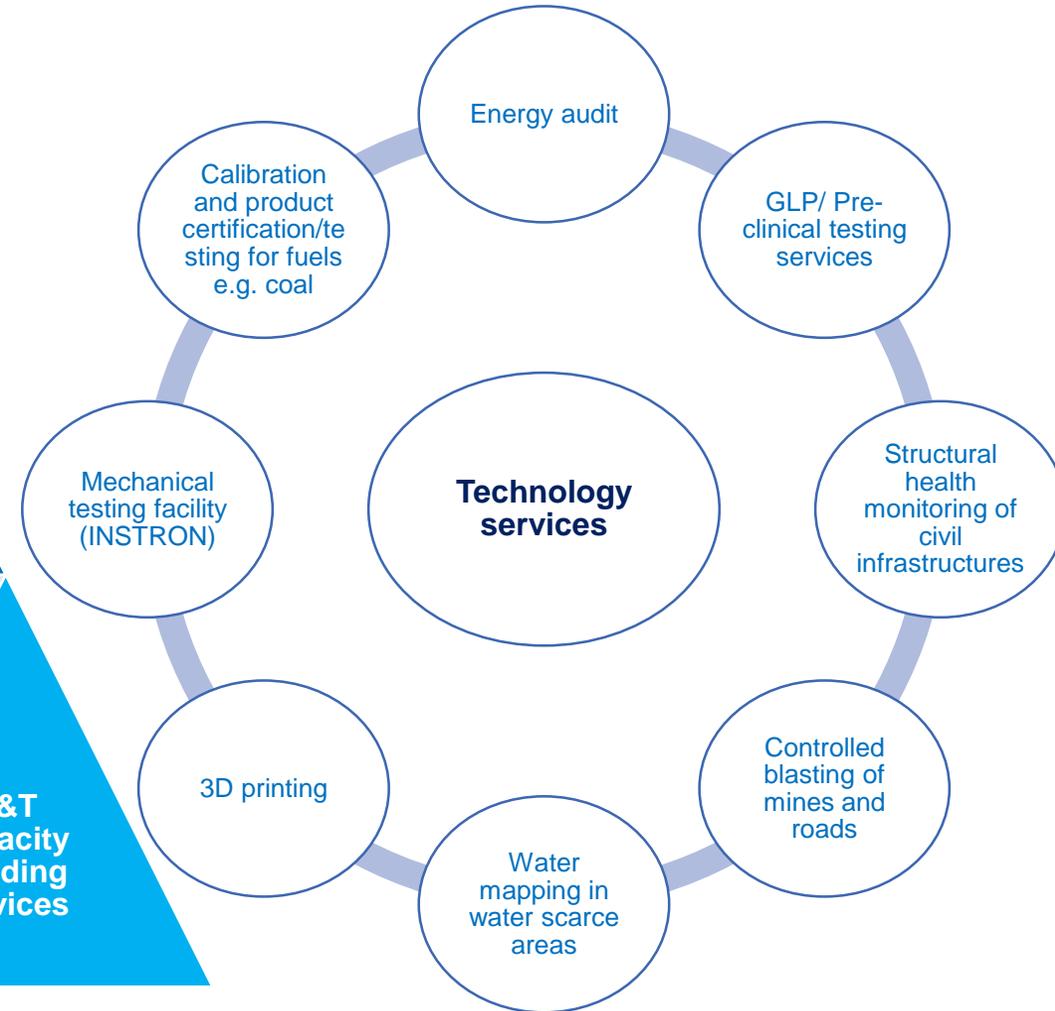
Summary statistics at the bottom:

- 37 LABORATORIES
- 25 SUBJECT DOMAINS
- 3200 ACTIVE PATENTS
- 900 TECHNOLOGIES

CSIR, INDIA



## Advanced services



<https://techindiacsir.anusandhan.net/online/Control.do?main=488t3s>

# Indicative CSIR Facilities



Chandrayaan-3 Launch Vehicle Testing @ CSIR WT facility (Trisonic Wind Tunnel )

**Biomolecular & Biomaterials Analysis**



**No. of Equipment - 108**

**Engineering Testing & Thermal Analysis**



**No. of Equipment - 341**

**Environmental Analysis**



**No. of Equipment - 66**

**Chromatography & Separation**



**No. of Equipment - 60**

**Structural and Elemental Analysis**



**No. of Equipment - 134**

**Surface & Particle Analysis**



**No. of Equipment - 124**

## Analytical facilities of CSIR

Test Booking and Equipment's details available at [AnalytiCSIR: https://www.analyticsir.in/index](https://www.analyticsir.in/index)

cGMP pilot plant for  
Extraction, Formulation  
and Packaging of  
Traditional (ISM) Herbal  
Medicinal Formulations



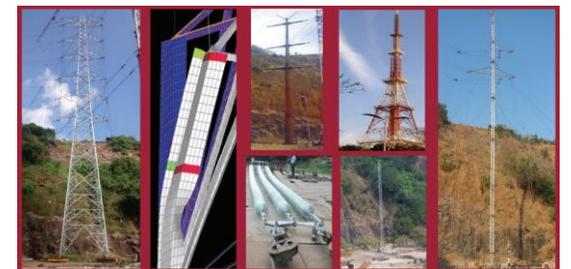
Capsule Filling Sealing Machine



Roller Compactor Machine



Microbial Type Culture  
Collection and Gene Bank



Tower Testing and Research  
Station

# CSIR's Research and Technology Collaborations across the Globe



'CSIR in the Service of the Nation' to 'CSIR for Globalization'

- Asia / Middle East**
- Bangladesh - BCSIR
  - Israel – DDR&D
  - Japan – HU, AIST, TU, TIT,
  - Nepal – NAST
  - Taiwan – ITRI, NAR
  - ROK - NST
  - Russia – SKOLTCH
  - China - NSFC,CAS, SBTS
  - Kuwait – KISR
  - Thailand - TISTR
  - Vietnam – VAST, VNU
  - Jordan – RSS
  - Saudi Arabia – KACST
  - Syria - SSRC
  - Mongolia - ASM

- Oceania**
- Australia- CSIRO, DU  
DITAC

- America**
- North America**
- NIH-NIEHS
  - Mayo Clinic
- South America**
- Mexico - AMEXID
  - Argentina - CONICET
  - Brazil - CNPq
  - Guyana – IAST
  - Peru - CONCYTECH

- Europe**
- Belarus – NASB
  - Czech Republic - CAS
  - Germany-BMBF, FHG, DAAD
  - France – CNRS, IP
  - Italy – CNR, TWAS
  - Turkey – TUBITAK
  - Switzerland – SFTA, [MMV](#)
  - Norway- SINTEF
  - Poland – PAS
  - Slovak - SAS
  - Slovenia – ICPE
  - UK – BBSRC



**55 Cooperation Arrangements with RTOs in 40 countries**

Green: Active – 15 No.  
Brown: Recently signed – 15 no.  
Blue: Dormant / Temp. inactive – 10 No.  
Black: No activity since over a decade-15 No.

- Africa**
- Egypt - NRC
  - Ethiopia - MIDI
  - Morocco - CNRST
  - Tanzania - COSTECH
  - South Africa – CSIR
  - Sudan – NCR

- Multilateral / Regional**
- |       |        |
|-------|--------|
| ASEAN | NAM    |
| BRICS | OPCW   |
| EU    | SIDS   |
| G8    | SCO    |
| G20   | SAARC  |
| IBSA  | WAITRO |

■ **Industry Connect:** 90 connects created with Industry from multiple countries from 2020 to 2023 (Dec)

● **HR Capacity Building:** 1332 Foreign Nationals trained by CSIR Labs from 2015 to 2023 (December)

▲ **Research Collaborations:** Till date 55 corporate level and 106 institute level (Jan 2015 onwards) Research Collaborations created with Multiple countries

**55 Corporate Level Research Collaborations: Unique and Focused Programmes catering to CSIR Labs**

# Various modes through which foreign organizations can engage in collaboration with CSIR, India

**Term of the Joint Working Programme:** Joint Working Programme would be initially for one year period. The programme can be extended or revised after its annual review.

- **Joint research projects:** Co-development, upscaling of existing interventions (based on written agreement with mutual funding arrangement)
- **Deployment of technology** solutions through Industries
  - ✓ Technology Mapping and Deployment
  - ✓ Industry Interaction Meets
- **Joint contracts of Industry:** Sponsored, Co-Development, Licensing CSIR tech. and Technology Transfers, Specific Service; Training and Skilled Manpower hiring
- **Joint PhD program** and scholar exchange
- **Delivering lectures/ providing short term training** both in India and Abroad
- **Housing of incubatees/start-ups** in Innovation Centres



# CSIR's International Industry Partners *(Indicative since 2022)*



70+ industries have partnered with CSIR since 2022

# Capacity Building of Developing Countries' Researchers through ISTAD

Building and strengthening the human capacities, establishing and strengthening image of Indian Science, generating CSIR brand Ambassadors, enhancing CSIR's global footprint

Specialized Training Courses

CSIR-TWAS Doctoral & Postdoc Fellowships

Host to fellowship awardees of DST (India Science & Research Fellowship Programme), DBT (TWAS) and NAM S&T Centre Schemes and of international programs

Over 30 scholars are currently in CSIR Institutes

- MoU concluded in 1991
- First batch received in 1993
- Over 324 Fellowships granted since 1993 (Doctoral - 171; Postdoc - 104)
- 246 Fellowships offered since 2007 (Doctoral : 157; Postdoctoral: 89)
- **Total 30 slots per year**

## CSIR-TWAS Fellowships

### Types of Fellowships

- ✓ Doctoral Fellowships- Upto 4 yr. research stay at CSIR labs
- ✓ Postdoc. Fellowships- Upto 1 yr. research stay at CSIR labs

### Funding Arrangement

- ✓ TWAS - Cost of international travel
- ✓ CSIR - Monthly stipend to the fellows

### Current Stipend

- ✓ Doctoral Fellowships - INR 37,000 p.m. for the first two years and INR 42,000 p.m. for subsequent two years during stay at the host institute
- ✓ Postdoctoral Fellowships – INR 61,000 p.m.

### Annual Budget

- Doctoral ~30 lakhs
- Postdoc ~93 lakhs

### Areas

- Agricultural Sciences
- Astronomy, Space and Earth Sciences
- Biological Systems and Organisms
- Chemical Sciences
- Engineering Sciences
- Mathematical Sciences
- Medical and Health Sciences incl. Neurosciences
- Structural, Cell, Molecular Biology
- Physics



# Partnerships through MEA for Capacity Building in various regions of the world

## Programs under Indian Technical and Economic Cooperation Programme (ITEC), MEA, GOI



**Biomedical Devices** - 64 programs since 1994-trained 1040 from 50 countries (3 courses annual)



**Petroleum Refining Technology & Petrochemicals** – one program since 2018 (trained 20 Mongolian specialists)



**Ocean Engineering and Technologies, Remote sensing applications** (4 courses annual since 2019)



**Rice Milling and Value-addition to Rice** (for Guyanese researchers) *approved in Dec'23/conducted in Feb-Mar'24*



**Online short training programs/workshops offered in Health**

**More structured (country-focused) courses are planned** (Env., Biodiversity, Infra)

Announced by Hon'ble PM in 14<sup>th</sup> East Asia Summit held in Nov 2019, for promoting maritime cooperation



**Proposal to set-up IORA CoE: Digital Knowledge Hub in Academic S&T Coop.** (including Disaster Risk Management) covering cross-cutting area of Blue Economy at CSIR-NIO

## Other Programs of MEA

CSIR-NIO is the Knowledge Partners for Capacity Building & Resource Sharing Pillar of Indo-Pacific Ocean Initiatives

CSIR-CIMAP established an Indian Ocean Rim Association (IORA) - RCSTT Coordination Centre on Medicinal Plants with MEA funding commitment of Rs. 3.05 Cr (over a 5 year period in 2018)

Construction of EQ-resilient buildings and training in Nepal

## Other Programs

- **FSSAI** – CFTRI, NIIST, IITR (Food safety)
- **NPL – PTB** Cooperation for training of SAARC nationals

# Services Offered To Maldives Towards Restoration Of Archeological Monuments



Archaeological Survey of India (ASI) appointed **CSIR-CBRI** to carry out structural engineering analysis of the structural work by ASI at the Hukuru Miskiy (Friday mosque) at Male, Maldives.



Malé Hukuru Miskiy



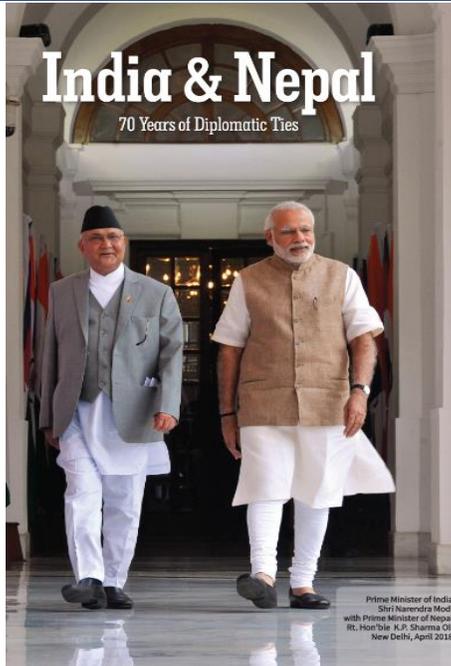
Malé Hukuru Miskiy

# Technology Support - Reconstruction of Disaster Resilient Schools in Nepal

**MEA awarded Planning, Design & Construction Monitoring of Education Sector Projects (Rs. 41.30 Cr.) towards reconstruction of 70 schools and 2 Libraries in EQ affected areas in Nepal**

## PRELUDE

- Construction in EQ affected area of Nepal
- ✓ 70 schools and 1 Library
- ✓ 132 Hospitals In 10 districts
- Planning, Design & Construction Monitoring by CSIR-CBRI of **“Education & Health Sector Projects in Nepal”**



## Capacity Building

- Trained 200 engineers in Housing Sector in Nuwakot and Gorkha districts.
- 25 Mayors of Nepal and 7 Members of Nepal Reconstruction Authority visiting CSIR-CBRI.
- Training of 2000 engineers in 7 earthquake affected districts of Nepal

## SIGNIFICANT OUTCOME

- Construction of 70 Schools, 1 Library
- 96 Hospitals completed & handed over
- No damage occurred during EQ in and around the site and constructed facility.
- Employment Generation
  - ✓ Construction: 2.5 million mandays
  - ✓ Operation: 6500 persons
- Beneficiaries : 3.0 million population
- 1600 class rooms
- 147 well equipped hospitals
- Online / Offline construction monitoring



# Technology And Skill Building Support To Bhutan



## Technology services

**CSIR-CIMFR:** Carried out controlled blasting in the landslide affected area of dam construction site of Punatsangchhu-I Hydroelectric Project, Bhutan. Excavation works in Dam Block No. 6 completed successfully (2020-21)



## Training programs

1

**CSIR-CCMB:** Training Workshop on **Wildlife DNA Forensics** - 5 Bhutanese Nationals attended from Department of Forest and Park Services, Thimphu, and Royal Bhutan Police, Bhutan) (29 Oct - 4 Nov 2023)

2

**CSIR-NPL: Online Scientific Interaction Programme (SIP)** for the National Metrology Institutes (NMI) of Bhutan (3-Bhutanese Nationals participated) (1-3 Nov 2022)

3

**CSIR-CSIO: 56-day** Training on Management Development Program on **Operation, Maintenance, Repair and Calibration of Bio-medical Equipment** (25 Nov. 2019- 17 Jan. 2020 under ITEC Programme)

4

**CSIR-NIScPR:** One week special training for 7 Bhutanese Nationals on **Library Management and Security Systems** (2018-19)

# CSIR–NAST, Nepal Cooperation

## Exchange of S&T information / documentation / material

- Need based with the prior approval from the competent authorities

## Exchange of specialists / researchers / scholars

- Exploratory missions and workshops (matching number of exchanges)

## Organising joint S&T seminars/workshops/ symposia - alternate year in India / Nepal

## Setting up of joint labs / pilot stations through Joint Venture

## Joint studies to explore natural resources and development of suitable tech. processes

## Use of each other's major facilities

- For exchange of Researchers, necessary facilities to be made available; authorship in related publications and other forms of IPRs to be shared.
- CSIR facilities (experimental, analytical etc.) and pilot plants can be availed on nominal charges bases for conducting NAST specific research work.

## Twinning of institutions

- Human and institution capacity building ; technical support; services for developing industry sectors



CSIR–NAST  
 MoU signing  
 on  
 18<sup>th</sup> Feb'25

## Organization of training courses

- Training programs for 2 weeks could be organized for the scientists and technicians of both the organizations.
  - Entire expenditure of the visit including travel and stay to be borne by sending side
  - Training fee to be decided in advance

## Fellowships

- NAST scientists can participate in the existing schemes of the two countries e.g. CSIR-TWAS Fellowships, DBT-TWAS Fellowship (to apply through proper channel)
- NAST scientists can participate in the PhD programs of AcSIR (CSIR-TWAS Fellowship can be utilized)

# Cooperation with BCSIR, Bangladesh

Capacity Building

- ❑ **Working Programs** executed **since 1994** under S&T Cooperation Protocol between DSIR and S&T Division of Bangladesh (now S&T Ministry of **July 1991**.
  - **5 CSIR-BCSIR Working Programs** executed between **1994 to 2021** with organization of **several thematic joint workshops and training programmes** in mutually agreed areas.
  
- ❑ **CSIR and BCSIR signed a cooperation MoU in September 2022** and the first Working Program under it in **May 2023**
  - 1<sup>st</sup> Joint Symposium on “*Advanced Functional and Smart Materials for Sustainable Development*” at Dhaka organised on 30-31 May 2023 with participation of 5 CSIR experts (NAL, CECRI, NPL, NIIST, NCL)
  - 2<sup>nd</sup> Symposium on '**Advancements in Material Characterization: A Glimpse into Diverse Applications**' held at CSIR-CLRI, Chennai on **14-16 Feb 2024**
    1. **Potential areas for CSIR technology transfer to BCSIR:**
      - a) Leather sector, b) Waste to Wealth, c) Advanced Materials,
    2. **Topics for future scientific collaboration identified:**
      - a) Infrastructure, b) Disaster Management, c) Climate Change, d) Agriculture



MoU exchanged on 6 Sep 2022



1<sup>st</sup> Joint Symposium at Dhaka



2<sup>nd</sup> Joint Symposium at CLRI



# CSIR's S&T Linkages with Russia

- ❑ TKDL and Federal Services for Intellectual Property (ROSPATENT), Russia – 2017
- ❑ Skolkovo Institute of Science and Technology (Skoltech) – Academic & S&T – All Areas – 2022
- ❑ St. Petersburg University – Joint Seed Money Agreement (JSMA)– to support seed money for initiating research proposals for Indo-Russian bilateral calls - 2024
  - ❑ “Nanogenerator for energy and self-powered sensors applications” CSIR-AMPRI and St. Petersburg State University – 2004

## Intergovernmental Programs (DST, DBT, BRICS, ICMR)

- ❑ **39 Collaborative projects** since 2015 by 19 CSIR Labs (4PI, CCMB, CDRI, CECRI, CEERI, CGCRI, CMERI, CSIO, CSMCRI, IGIB, IICT, IHBT, NAL, NCL, NEIST, NGRI, NIIST, NIO, NML)
  - ❑ **Main Areas:** Oceanography, Coastal Sciences Horticulture, Additive Manufacturing, AI, Chemical Technology and Bio-Chemistry, Ecology, Environment, Energy

Effort being made to develop Corporate Level Cooperation Mechanisms and Lab Level Topical Cooperation Framework



Patestate.com  
CSIR India Patent Database

[CSIR India's Patent Database](http://www.patestate.com)

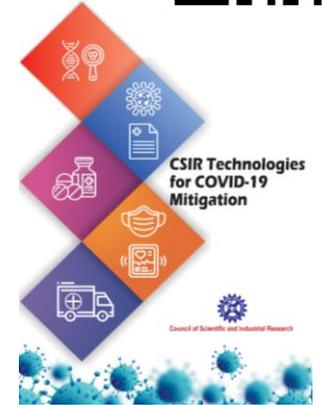
**Namaskar!**  
**Thank You**



[CSIR Technologies Compendium](#) (all sectors- TRL 6+)



[CSIR Medical Instruments and Devices Compendium 2022](#)



[CSIR COVID-19 mitigation technologies Compendium](#)

37 LABORATORIES

+7500 S&T Personnel

25 SUBJECT DOMAINS

+10,000 PATENTS

+5647 SCI Publication

+900 TECHNOLOGIES

**CSIR Welcomes Collaborations** with global scientific community, industry, start-ups, policymakers and think-tanks, financial institutions, investors and other stakeholders for working towards **Global Sustainable Development**



**How to partner with CSIR:** <https://www.csir.res.in/csir-outreach>

**For Collaborations Reach Out to**  
**Dr. Rama Swami Bansal**, Chief Scientist and  
Head International S&T Affairs, CSIR, India;  
Email: [rsb@csir.res.in](mailto:rsb@csir.res.in)