



Office of the Principal Scientific Adviser
to the Government of India

Science and Technology Clusters

Annual Report

2022-2023



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अजय के. सूद

भारत सरकार के प्रमुख वैज्ञानिक सलाहकार

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Principal Scientific Adviser to the Govt. of India



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FOREWORD

As we progress into the 21st century, it is becoming increasingly clear that scientific and technological advancements are crucial for the continued growth and prosperity of our nation. The Office of the Principal Scientific Adviser (PSA) to the Government of India recognizes this fact and has been working tirelessly to ensure that India remains at the forefront of scientific and technological innovation.

With 2030 fast approaching, India has made considerable progress towards achieving the Sustainable Development Goals, but much work remains to be done. The S&T clusters have a crucial role to play in addressing some of the most pressing challenges facing our nation and the world.

S&T clusters drive socio-economic growth in India for Atmanirbhar Bharat, provide a platform for multidisciplinary research and innovation, facilitate the translation of scientific discoveries into real-world applications, facilitate collaboration among different stakeholders, including academia, industry, and government, and become a regional solution provider with the capacity to expand globally. The S&T Clusters initiated their operations during 2020, the trying times of COVID-19. Despite the challenges, the initial 5 Clusters namely Bhubaneswar, Delhi, Hyderabad, Jodhpur, and Pune have shown good progress and success of these Clusters has inspired the formation of further new clusters - Bangalore Cluster anchored at IISc being the most recent one. We want these clusters to have further linkages through the Section 8 companies created under their aegis.

This report is an important part of understanding the role of S&T clusters in India, provides a comprehensive overview, important for monitoring progress and identifying opportunities for collaboration and innovation, also serves as a platform for showcasing success stories and identifying areas of improvement, and facilitates transparency and accountability.

As we look towards the future, it is clear that S&T clusters will continue to play a critical role in shaping India's scientific and technological landscape. I hope that this report will serve as a valuable resource for policymakers, researchers, and other stakeholders as we work together to build a brighter future for our country and the world.

(Ajay K. Sood)

Dated: 10th May, 2023





सत्यमेव जयते

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Scientific Secretary

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MESSAGE

At a time when the world is grappling with numerous challenges, including climate change, environmental degradation, and economic uncertainty, Science and Technology have become more critical than ever before.

As India strives towards becoming a leading global power, it is essential that we harness the potential of Science and Technology to fuel our growth and development.

The S&T Clusters, a flagship initiative of the Office of the PSA, play a vital role in promoting innovation, research and development, and entrepreneurship in various sectors, and are an essential component of India's journey towards socio-economic advancement.

The Annual Report on S&T Clusters provides an overview of the progress made over the past year by each of these six clusters, established across the Nation. It highlights the various initiatives taken by the Government of India and other Stakeholders to promote Research and Innovation in key sectors such as healthcare, agriculture, energy, and environment. It also features case studies of successful S&T cluster projects that have made a significant impact at the grassroot level.

The connect with local government and industry is indeed encouraging and within a short period of time the clusters have achieved remarkable progress. Over the past years, we have witnessed the growth and development of the Clusters via the deployed technologies under the thematic areas such as BioScience, Polymer based Interventions, Wetland Management, Waste to Value at Bhubaneshwar; Water Security, Green Mobility, Effective Education, Sustainable Energy at Delhi; Food and Agriculture, Life Sciences, Sustainability at Hyderabad; Medical Technologies, Handicrafts & Handlooms, Water & Environment, I-Governance, THAR Designs at Jodhpur.

This is a unique concept where each cluster has a dedicated full time CEO who is responsible for its overall progress. With the progress in manifesting the impact on ground level, we look forward to seeing the outcomes they have on the S&T ecosystem in the coming years.

We take this opportunity to urge the stakeholders to come forward and work together towards the common goals of Science and Technology via the S&T Clusters in India.


(Parvinder Maini)

Dated: 12 May, 2023

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Science and Technology Clusters

Annual Report

Science & Technology Clusters (S&T Clusters), a flagship initiative of the Office of the Principal Scientific Adviser (PSA) to the Government of India (GoI), were established after the recommendation of the Prime Minister's Science, Technology, and Innovation Advisory Council (PM-STIAC).

Presently, six S&T Clusters—in Bengaluru, Bhubaneswar, Delhi-NCR, Hyderabad, Jodhpur, and Pune—are striving to solve local problems in a consortium mode. This initiative brings together academia, R&D institutions, industries, and local governments to tackle regional problems through S&T interventions. These clusters are pivotal for facilitating collaborative research to solve local and global challenges and realise the vision of 'Atmanirbhar Bharat'.

To achieve this goal, each S&T Cluster brings together a group of institutions, including academia, research laboratories, industry partners, start-ups, ministries of micro, small, and medium enterprises (MSMEs), state governments, philanthropic foundations, and international organisations. The clusters operate under a formal umbrella structure while retaining their internal autonomy, thus creating a shared ecosystem that fosters collaboration among stakeholders.



The S&T Clusters operate in a three-tiered pyramid approach. The bottom tier involves creating a shared ecosystem among the institutions, the second-tier places focus on becoming a regional solution provider, and the topmost tier is aimed at the clusters becoming nationally and globally competitive. By working together and leveraging their collective strengths, the clusters aim to bring positive impacts on the economy and society at large.

Each Cluster has a unique area of focus, R&D activities, and collaborations with industry partners, academic institutions, and government agencies.

The report shall delve further into the work, focus areas, success stories, and future outlooks of individual S&T Clusters.

Bengaluru Science and Technology Cluster (BeST)

www.bestkc.in



Bengaluru Science and Technology Cluster (BeST)



The Bengaluru cluster, launched in November 2022 during the plenary session of the Bengaluru Tech Summit, is the most recent addition to the S&T clusters. It is currently anchored at the Indian Institute of Science (IISc), Bengaluru, Karnataka.

Karnataka has a unique S&T ecosystem due to its talented pool of scientists and engineers, academic institutions, a thriving start-up ecosystem, and the presence of multinational companies. BeST aims to cultivate a distinctive culture of innovation, further strengthening the region's position as a global innovation hub.

The Hexa-Helical model: BeST will function on the principle of an inclusive hexa-helical model, spanning a wide variety of sectors and stakeholders—including academia players, industry/start-ups/professional associations, government agencies, investors and funding agencies, strategic sectors, and non-governmental organisations (NGOs)—who will participate in the cluster activities.



Thematic Areas

Health and Wellness

- Digital Health
- One Health

Futuristic Technologies and Solutions

- Quantum Technologies
- Active Matter and Micro-robotics
- Jet Engines

Urban Life

- Precision Agriculture
- Mobility
- Monsoon, Weather, and Climate

The areas 'Health and wellness' and 'Urban life' are BeST's current priority, whereas 'Futuristic technologies and solutions' will be pursued at a later stage.





Key Projects/Initiatives

The One Health Cell

The One Health Cell was launched on 23rd November 2022, in collaboration with the Bruhat Bengaluru Mahanagara Palike (BBMP). The initiative aims to determine how data generated from diverse sources can be used to inform policymaking for the improvement of overall health-related aspects of the city. Learnings from this novel initiative will form the basis for scaling One Health to the national level.

Forming a Consortium to Set Up a Green Hydrogen Valley in Karnataka

Based on a strong foundation laid by local policymakers, industrialists, innovators, and researchers, the BeST Cluster is forming a consortium of stakeholders for a hydrogen valley in Karnataka. The cluster has been conducting several discussions and brainstorming sessions with key stakeholders in the entire value chain of hydrogen (production, storage, transportation, and utilisation) across Bangalore, involving academicians, researchers, local government bodies, original equipment manufacturers, start-ups and companies, industry associations, knowledge partners, and international players to drive a hydrogen-based economy in the state.



Overview of Funds Received

In the financial year 2022–2023, the BeST Cluster received seed funding from the Office of the PSA in September 2022. They are actively building cross-sector relationships to explore additional funding sources.





Key Partners



Academia:

- Indian Institute of Science (IISc)
- National Centre for Biological Sciences (NCBS-TIFR)
- TATA Institute for Genetics and Society (TIGS)
- InStem
- Ashoka Trust for Research in Ecology and the Environment (ATREE)
- Biome Environmental Solutions
- RTI International
- Bengaluru Sustainability Forum, Echo Network
- Initiative for Climate Action
- Centre for Cellular and Institute of Endocrinology Research
- University of Trans Disciplinary Health Sciences and Technology (TDU)
- St. John's Research Institute (SJRI)
- International Centre for Theoretical Sciences (ICTS-TIFR)
- Indian Institute of Technology (IIT), Madras
- Indian Institute of Technology (IIT), Delhi
- Indian Institute of Technology (IIT), Kharagpur
- Indian Institute of Tropical Meteorology
- Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR)
- University of Agriculture Sciences (UAS)
- National Institute of Ocean Sciences
- Indian Council of Agricultural Research (ICAR)
- National Bureau of Agricultural Insect Resources (NBAIR)
- Raman Research Institute
- Centre for Artificial Intelligence and Robotics
- Gas Turbine Research Establishment (GTRE)



Government:

- Bruhat Bengaluru Mahanagara Pallike (BBMP)
- Directorate of Urban Land Transportation (DULT), Urban Development Department, Government of Karnataka
- Indian National Centre for Ocean Information Services (INCOIS)
- Hindustan Aeronautics Limited (HAL)
- Indian Space Research Organisation (ISRO)



Industry

- Molecular Solutions
- Care Health
- Centre for Cellular and Molecular Platforms (C-CAMP)
- Mimyk
- Foot Secure
- Robert Bosch Engineering and Business Solutions
- Orbifold Solutions
- Ankur Seeds
- I&B Seeds
- Indus Seeds
- ATGC Biotech
- MetEarth Technologies
- QuNu Labs
- Theranautics
- National Association of Software and Service Companies (NASSCOM)



MoUs Signed (2022–2023)

MoU With the BBMP

Date of signing: 23rd November 2022

The One Health team, which represents a key BeST Cluster project led by Prof. Uma Ramakrishnan from NCBS and Principal Scientist Farah Ishtiaq from TIGS, formed the One Health Cell with BBMP. This cell aims to

determine how data generated from diverse sources can be used to inform policy-making for improving the overall health aspects of the city. Learnings from this novel initiative will be the basis for scaling One Health activity regionally and nationally

Future Outlook

The future outlook of the BeST Cluster is focused on fostering collaborations between industry, academia, and research institutions. One key aspect is the establishment of industry-led collaborations, aimed at mapping industry tech requirements in a 6–36-month timeframe. By creating use cases for existing research innovations and building formal relations with prominent industry bodies like BCIC, NASSCOM, CII, FICCI, the cluster aims to facilitate the adoption of cutting-edge technologies by industries.

The cluster also emphasises academia collaborations, recognising the importance of knowledge exchange and cross-pollination of ideas. By forming high impact consortia that are research-led and supported by industry, policy, funding agencies, and tech innovators, the cluster aims to tackle critical challenges such as climate change, agriculture, semiconductor development, and quantum technology. The ability to raise funds from foundations and government bodies strengthens the cluster's capacity to drive impactful research and innovation in these areas.

The third area of focus is providing an impetus to the start-up ecosystem within the country. By providing a platform for theme-based startups to interact with industry, the cluster encourages collaboration and knowledge transfer between emerging entrepreneurs and established players.

Overall, by aligning research with industry needs, establishing high impact consortia, and facilitating funding from various sources, the BeST Cluster aims to position itself as a hub for cutting-edge technological advancements and innovation-driven economic growth.



News and Events

BeST Cluster Launch

16th November 2022



Welcoming the Swedish delegation of S&T innovators

5th December 2022



Meeting with the Bangalore Chamber of Industry and Commerce (BCIC)

16th December 2022



Meeting with the BBMP for the formation of the One Health Cell

23rd November 2022



Launch of the One Health Bengaluru City Consortium

3rd March 2023



Meeting with the Indian Institute of Science (IISc) as part of the UK-India Innovation for Net Zero Initiative (INZI)

15th March 2023



Bhubaneswar City Knowledge Innovation Cluster (BCKIC)

www.bckic.in



Bhubaneswar City Knowledge Innovation Cluster (BCKIC)



The Bhubaneswar City Knowledge Innovation Cluster Foundation is established at the Technology Business Incubator of Kalinga Institute of Industrial Technology (KIIT) University, Bhubaneswar.

BCKIC focuses on macro and micro-S&T ecosystem development. It collaborates with academic institutions, start-ups, industries such as the Jindal South West Group and Bayer India, and philanthropic organisations such as the India Health Fund to foster a vibrant S&T ecosystem in the region. It has also engaged with various government partners, such as the Odisha Forest Sector Development Society (OFSDS).



Thematic Areas

- Biosciences
- Polymer-Based Intervention
- Advanced Materials
- Wetland Management
- Waste to Value
- Grassroots Level Interventions



Key Projects/Initiatives

Quest 2022 Challenge Focused on Infectious Diseases

The QUEST 2022 Challenge, a collaboration between BCKIC, the India Health Fund, and other partners, aims to identify and support innovative solutions to combat infectious diseases. The challenge is focused on three key segments of infectious disease management: screening and diagnosis, care pathways, and disease surveillance.

- The screening and diagnosis subtheme aims to develop and deploy cost-effective innovations for easy sample collection, handling, and storage to minimise the risk of exposure to infectious pathogens.
- The care pathways subtheme explores the development of tools to improve treatment adherence and strengthen treatment outcomes.
- The disease surveillance subtheme focuses on using technologies to increase the integration of health information for improving case finding and notification in infectious diseases.

Restore Promise of Water (RPOW) in Odisha

The BCKIC Foundation, with support from the IIT network, launched the Restore the Promise of Water programme to address water scarcity by increasing water holding capacity in tanks and enhancing the fertility of fields. A pilot project in the villages of Rayagada district, Odisha, has been completed with support from the farmers in the region. The initiative has also received excellent support from the Strategic Alliance Division, Office of the PSA. With a long-term vision, BCKIC aims to rejuvenate multiple water bodies in the region, positively impacting the existing water table and fulfilling the promise of water to farmers and locals.

Nanostructured Alumina-based Electrodes for Supercapacitors

The improved property of Al-graphene composite materials leads to the advanced material group's improved electric and heat dissipation capacity. As a next step, efforts are being made to show the proof of concept with prototypes made through these advanced Al-graphene composites to raise funds.

Odisha Forestry Sector Development Project, Phase-II:

BCKIC partnered with the Jajpur district administration to explore resource mapping of the district and identify key interventions to drive new enterprises based on indigenous resources and new technologies. The partnership aims to augment the district's economic and societal development, create new enterprises, and serve as a model for grassroots-level innovation. The interventions include bamboo processing, biofertilisers, bakery, tissue culture, paper recycling, groundnut oil processing, and more, with support from the National Innovation Foundation.

Bayer Fellowship Programme—MEDHA

Bayer Crop Science Limited and BCKIC launched the Medha Fellowship Programme to provide financial assistance to economically weaker students pursuing higher studies in life sciences, biotechnology, and pharma disciplines. The fellowship provides financial aid of ₹20,000 and ₹40,000 per month for postgraduate and Ph.D. students, respectively. The students will also get an opportunity to participate in workshops on grant writing, innovation, and entrepreneurship. The programme was supported by the Office of PSA.





Overview of Funds Received

In the financial year 2022–23, BCKIC received a funding from the Office of PSA in November 2022. BCKIC has raised a total of ₹824 lakhs for The Diagnostic Innovation Hub, Operationalising Multi-Product Cluster in Odisha Forest Divisions, Ground Water Assessment,

Waterbody Rejuvenation, Make in Odisha Conclave (Biotech sector), and Science and Tech Popularisation. In addition, a fund of ₹8.4 crores is being mobilised for direct disbursement to the doctoral and postgraduate students under the Bayer Fellowship Programme—MEDHA.



Key Partners



Academia:

- CSIR—Institute of Minerals and Materials Technology, Bhubaneswar
- Institute of Chemical Technology—Indian Oil Campus, Bhubaneswar
- Central Institute of Petrochemicals Engineering & Technology, Bhubaneswar
- Indian Institute of Technology, Bhubaneswar
- National Institute of Science Education and Research, Bhubaneswar
- Indian Institute of Science Education and Research, Berhampur
- Birla Global University, Bhubaneswar
- ICAR—Central Tuber Crops Research Institute, Bhubaneswar
- CSIR—Institute of Minerals and Materials Technology, Bhubaneswar
- Kalinga Institute of Social Sciences (KISS)
- Kalinga Institute of Industrial Technology (KIIT-DU) / KIIT TBI
- Ravenshaw University, Cuttack



Government:

- Science and Technology Department, Government of Odisha
- Jajpur District Administration
- OFSDS
- Odisha Bigyan Academy



Industry:

- National Aluminium Company Limited (NALCO)
- Huwel Lifesciences
- Tirupati Graphene & Mintech Research Centre (TGMRC)
- Eesavyasa Technologies Pvt. Ltd.
- ATMASCO Ltd. (ATML)
- SRF Ltd.
- Bayer India



MoUs Signed (2022–2023)

Science and Technology Department, Government of Odisha

BCKIC signed an MoU with the Science and Technology Department, Government of Odisha, focussing on launching joint initiatives to strengthen the state's Science, Technology, and Innovation ecosystem.

National Aluminium Company Limited (NALCO)

BCKIC and NALCO signed an MoU to collaborate on developing marketable and scalable solutions to the problems faced by NALCO, with BCKIC utilising its partner institutions to provide viable solutions. NALCO will also share its research infrastructure and commercial expertise with the institutions, providing a platform for start-ups to accelerate innovations with translational impact in rural health, livelihood, and environmental amelioration.

Indian Institute of Science Education and Research (IISER) Berhampur

The MoU with IISER Berhampur aims to strengthen Odisha's science and technology ecosystem. The goal is to mutually complement and augment the knowledge and innovation space with a translational impact. BCKIC shall work extensively in problem identification with its network of academia, industry, government, and start-ups. IISER Berhampur's institutional expertise shall provide a strong foundation for bringing technology-driven solutions.

The India Health Fund—a TATA Trust Initiative

With a special focus on its Diagnostic Innovation Hub, BCKIC signed an MoU with The Confluence for Health Action and Transformation Foundation, the legal entity of the India Health Fund, an initiative of TATA Trust. The strategic partnership is geared towards supporting innovation on infectious diseases. It includes activities such as developing joint programmes for various specific technological themes. The themes focus on healthcare technologies and aim to transform the research and innovation developed from laboratories to the market.

IIT-IIT: a Pan-IIT Alumni Network

An important collaboration has been established with IITians For Influencing India's Transformation (IIT-IIT) through an MoU with the Best Practices Foundation representing IIT-IIT. The partnership focuses on implementing ground-level interventions to address the water scarcity challenges faced by various regions in Odisha. The collaboration aims to build the capacity of local NGOs to scale the rejuvenation of water bodies, benefit local farmers with the silt, and restore the water supply for the community.



Success Stories

Restore Promise of Water (RPOW) in Odisha



Before (left) and After (right) implementing the RPOW project at three waterbodies, Jasoda Bandha, Patra Bandha, and Jigyan Sagar, in Dangasorada village of Chandrapur block, Rayagada District, Odisha.

The pilot project under the RPOW initiative was initiated at the Chandrapur block of the Rayagada district in Odisha. In this area, the locals faced severe water crises in summer/ pre-monsoon seasons due to low or delayed rainfall for several years. This severely impacted their agricultural activities and livelihood.

Three dried-up waterbodies were chosen for the project. Their water storage capacity was enhanced by an additional four crore litre, and 10,000 cubic metres of highly nutritious silt was excavated from the ponds and transferred to cultivable lands, thereby reducing long-term fertiliser costs.

The pilot involved 250 local farmers and led to the establishment of a win-win relationship between farmers and local water bodies.

Success Stories

Make in Odisha Conclave

BCKIC was the knowledge partner of the Government of Odisha's S&T Department at the Make in Odisha Conclave 2022. Its role was to showcase the science and technology-driven start-up ecosystem through a dedicated S&T pavilion and conduct a special sectorial session on investment opportunities in biotechnology. In this conclave, Bharat Biotech committed to invest another ₹700 crore for expanding its operations in the state through its anchor tenant M/s Sapigen BiologiX Pvt. Ltd. Additional investment MoUs were signed between the state government, CorpGene, and Huwel Lifesciences for the investment of ₹500 crore and ₹50 crore respectively.

Moreover, MoUs were signed between the

government and the Association of Biotechnology Led Enterprise to bring biotechnology industries to Odisha, mentor and nurture biotech start-ups, and bring International Knowledge Groups to Odisha. Another partnership was established with the International Body of Global Network of Entrepreneurs and Professionals for Odisha to facilitate Global-Odisha entrepreneurial exchanges and promote bio-entrepreneurship development in the state.

Bayer Fellowship—MEDHA

Over 3,200 students across India applied for the fellowship. After a careful selection process, 125 awardees were chosen, including 75 women and 12 Divyang Jan.

Future Outlook

BCKIC is on a mission to promote and facilitate innovation-driven growth and development. Looking forward, the cluster plans to establish Centres of Excellence in the mineral, material, and metallurgy sector, leveraging the strengths of the state. In particular, the project on effective recovery of nickel and cobalt from chromite overburden has the potential to generate substantial economic value from local resources. The project on the Chilika Phragmites issue—which is leading to restricted boundaries of lake—has resulted in the development of a particle board from reed biomass which can provide a cost-effective mechanism for removal and utilisation of reeds, leading to a viable containment solution. The project on producing high-quality sanitary pads from local resources in Kalahandi district has matured and is being supported by corporate donors for industry-grade manufacturing and piloting. The cluster is also

working towards scaling up and propagating regional innovations in Northeast India.

A comprehensive programme with the Odisha Forest Department to support the sustainable harvest and processing of non-timber forest products (NTFPs), spread across 12 forest divisions covering 1200 Vanya Sahayata Samitis, is poised to include 24,000 beneficiaries for its successful implementation. Finally, the RPOW project is on track to upgrade to 200 modules in the near future, leading to an additional water holding capacity of 200 crore liters. In the long term, the project is expected to have an impact on more than 1000 waterbodies.

With a strong focus on grassroot interventions, BCKIC is well-positioned to make a meaningful impact on the economy, environment, and social welfare of the state of Odisha and the rest of the country.



News and Events

UK India Health Technology Bootcamp



Northeast Start-Up Showcase (NESS) Summit 1.0



Hosting delegates from the Royal Society of Chemistry and Indo-UK Science and Innovation Network



Make in Odisha Conclave 2022



Vigyan Sarvatra Puujate: National Science Week Festival 2022 commemorating 75 years of independence



Swachh Sagar, Surakshit Sagar (Clean Coast, Safe Sea) Campaign



Project Review and Monitoring Committee Meet



Delhi Research, Implementation, and Innovation (DRIIV): the Delhi Cluster

www.driiv.co.in



Delhi Research, Implementation, and Innovation (DRIIV): The Delhi Cluster



The DRIIV ecosystem brings together more than 50 stakeholders, including academic institutions, national and state research laboratories, industry partners, start-ups, MSMEs, relevant ministries, state governments, and philanthropic foundations. Currently anchored at the Indian Institute of Technology (IIT) Delhi, the DRIIV Cluster helps to take innovations from lab to market, which can address issues aligned with the UN's Sustainable Development Goals (SDGs). It also offers opportunities for start-ups and researchers to implement solutions for local government bodies. Under the auspices of DRIIV, 14 sustainability projects in waste to wealth, air pollution mitigation, e-mobility, healthcare AI/ML, water security, and effective education are already being executed, or will soon be executed, in collaboration with local government bodies. In addition to working with public bodies and research communities, the cluster also mobilises private capital under corporate social responsibility to contribute to various environmental sustainability projects.



Thematic Areas

- Solid Waste Management
- Water Security
- Air Pollution
- AI/ML Healthcare
- Sustainable Mobility
- Effective Education



Key Projects/Initiatives

Project SAMEER (Solutions for Air-Pollution Mitigation Through Engagement, Engineering, and Research)

To tackle air pollution in Delhi, DRIIV launched Solutions for Air Pollution Mitigation through Engagement, Engineering, and Research (Project SAMEER) on 19th October 2022. SAMEER is a first-of-its-kind initiative in terms of design, as it involves all the stakeholders with the responsibility, authority, and capability to tackle the problem. Under this project, local government authorities, researchers from IIT Delhi, tech start-ups, corporates, NGOs, and citizens are working to de-smog the capital. A three-pronged approach involving awareness and community engagement, S&T interventions, and brainstorming ideas with industry has been outlined for the implementation.

Crop Residue Management

ITC Limited has collaborated with the Arun Duggal Centre of Excellence for Research in Climate Change, IIT Delhi, for GIS mapping technology to improve its Crop Residue Management Programme in North India. The programme aims to mitigate the heavy blanket of smog which frequently covers the National Capital Region during winters due to stubble (*parali*) burning.

One Delhi App

The One Delhi App, developed by DRIIV for Integrated Multimodal Transit Data and Depot Management, has been adopted by the Delhi Government. This app digitises public transport services and makes it easy for the public to use buses with features such as real-time arrival tracking and e-ticketing. The app, launched by Mr. Kailash Gahlot, Hon'ble Minister of Transport, Government of NCT of Delhi, is available here: <https://bit.ly/OneDelhiApp>

Green Mobility

DRIIV's Green Mobility initiative aims to improve electric vehicle (EV) charging infrastructure, battery management systems, and power electronics. DRIIV has developed a range of EV chargers for home and public use, incorporating timers and Wi-Fi connectivity. It has also created a mobile-cum-web app for smart and secure EV infrastructure in the city that allows users to locate the nearest charging station and book a slot. Additionally, it is developing a robust EV charging and battery swapping infrastructure that can manage intra-city load and cater to inter-city vehicular movement.

Green Campus Initiative in Collaboration with Log9 Materials Scientific Pvt. Ltd.

Driven by the commitment to Go Green, DRIIV has started promoting sustainable and eco-friendly practices in the IIT Delhi campus, where its start-up partner Log9 has donated two three-wheeler EVs. These EVs are being utilised to facilitate the transportation of goods in the hostel premises. This initiative will soon be extended to other campuses of DRIIV's partner institutes (Indraprastha Institute of Information Technology, Delhi and Ashoka University).

Collective Responsibility Drive (CRD)- Recycling: Making a Difference with Blue Nudge

To encourage more youngsters to contribute to saving the environment, Blue Planet Environmental Solutions India Pvt. Ltd., a subsidiary of a Singapore-based company, has joined hands with DRIIV to run their flagship programme **CRD-Recycling**. This drive aims to encourage 10 million youth to collect 1 billion plastic waste items, thereby preventing them from being dumped into landfills. Ultimately, the project aims to mobilise learners at the school level to become agents of change in bringing about a sustainable recycling revolution.





Overview of Funds Received

In the financial year 2022–23, DRIIV received funding from the Office of PSA in December 2022. Additionally, they secured external funding of approximately Rs 19 Crores across various thematic areas.



Key Partners



Academia:

- Indian Institute of Technology (IIT), Delhi
- Jawaharlal Nehru University (JNU)
- Delhi Technological University (DTU)
- Netaji Subhas University of Technology (NSUT)
- All India Institute of Medical Sciences (AIIMS New Delhi)
- Indraprastha Institute of Information Technology (IIIT Delhi)



Government:

- CSIR–Institute of Genomics and Integrative Biology (IGIB)
- ICAR–Indian Agricultural Research Institute (IARI)
- Delhi Transport Corporation (DTC)
- Delhi Metro Rail Corporation (DMRC)
- Delhi Pollution Control Committee (DPCC)
- CSIR—Central Road Research Institute (CRRI)



Industry:

- Tata Power
- Mahindra
- BSES Rajdhani Power Ltd.
- BSES Yamuna Power Ltd.





MoUs Signed (2022–2023)

Umbrella MoU with Municipal Corporations Across Haryana

Fulfilling the Office of PSA S&T Clusters' objective of being a local solution provider, DRIIV has signed an umbrella MoU with the Gurugram Metropolitan Development Authority, Municipal Corporation of Gurugram, and Haryana Pollution Control Board, to collaborate on the ground-level implementation of various technologies and initiatives tackling environmental and societal issues like municipal waste management, wastewater treatment, public health, etc.

St. Patrick's Realty Private Limited

DRIIV and Central Park Billion have joined hands to collaborate on a technology hub project. The collaboration aims to effectively utilise the intellectual capabilities of the cluster and its members for research and technological development and to promote interactions between industry, academia, and the government. The partnership will also help strengthen the start-up ecosystem and ensure long-term financial stability.

DRIIV and Ease of Doing Business (EoDB)

DRIIV and National Highways for Electric Vehicles/ Atal Harit Vidyut Mahamarg have signed an MoU to collaborate and explore opportunities in the e-mobility sector, focusing on identifying strategic research agendas and leveraging mutual interests.

Log9 Materials Pvt. Ltd.

DRIIV and Log9 Materials Pvt. Ltd. have signed an umbrella MoU to establish a collaboration between the latter and the Centre for Automotive Research and Tribology (CART) at IIT Delhi. Under this MoU, DRIIV will facilitate the long-term collaboration between CART and Log9 on various academic and industry projects.

Blue Planet

DRIIV and Blue Planet have signed an MoU to collaborate on environmental sustainability, waste management, and other areas of national importance. Their goal is to establish an environmental compliance and waste management system across all member institutions of CKIC-DRIIV under the PSA DRIIV-BPES CRD Fellowship. The MoU will implement and launch the PSA DRIIV-BPES CRD Fellowship, identify suitable organisations to run and implement CRD in schools, encourage cluster member institutes to practice source segregation, and bring segregated waste back to the institution for upcycling.

11 partner schools in Delhi-NCR

Towards the effective implementation of the National Education Policy (NEP) 2020, DRIIV signed an MoU with 11 partner schools in the Delhi-NCR region. This collaboration will drive the reinvention of the education system for futuristic teaching and learning, including courses on AI/ML, digital pedagogy, gamification, and green curriculum.

Success Stories

Workshops Conducted Under Project SAMEER (Solutions for Air-Pollution Mitigation Through Engagement, Engineering, and Research)

Under the Project SAMEER initiative, DRIIV has conducted various awareness workshops for communities such as farmers, students, and resident welfare associations. While the workshop for farmers in Punjab and Haryana was aimed at encouraging farmers to shift away from stubble burning due to its enormous health hazards, the ones on Sustainable Air Quality, organised by DRIIV's Effective Education team at schools across Delhi and Gurugram, in association with the Lung Care Foundation, aims to connect educators with air quality experts, technology partners, regulators, and scientists.

End users: Students, farmers, and RWAs

Pilot Run of Air Pollution Control Technologies in the Delhi-NCR Region Under Project SAMEER

From November 2022 to February 2023, several air pollution measurement and mitigation technologies—contributed by 15 start-ups from across the country for free—were deployed at previously designated air pollution hotspots in Gurugram. The aim was to analyse the extent to which air quality could be improved through technological intervention. The results will determine whether the technologies could be scaled up to the national level as a solution to the increasing problem of air pollution in the country.

End users: Citizens of Delhi NCR region

Mitigation of Parali Burning

ITC and CERCA's Crop Residue Management Programme in Kapurthala district, Punjab, has achieved zero stubble burning in 89.7% of the targeted area. It has also resulted in higher farmer incomes, greater productivity, reduced cultivation costs, and significant water savings in paddy and wheat crop cultivation through the direct seeding of rice and zero tillage sowing of wheat.

The ONE DELHI Application

The Delhi Government Transport Department and the Center for Sustainable Mobility at IIT, Delhi collaborated to develop the ONE DELHI App. The app was designed to meet the needs of public transport and electric vehicle (EV) users in Delhi. In early 2022, a new beta version of the app was launched for Android and iOS users, incorporating the following key features:

- Live Bus Tracking
- Contactless Ticketing
- Journey Planner
- EV Charging
- Official Complaint and Feedback System
- Route Assignment

The ONE DELHI App has garnered 500,000 downloads on the Google Play Store and caters to approximately 200,000 daily users. The app enables users to track buses and access real-time coordinates, enhancing their overall commuting experience. The algorithm and accompanying software can be replicated in other cities as well.

End users: Citizens of Delhi NCR region

Future Outlook

Since its inception two years ago, DRIIV has made rapid strides in creating a vibrant S&T cluster in Delhi NCR. They have built a network of over 100 cluster members across disciplines, all working collaboratively towards regional problems.

DRIIV also has several initiatives planned for the next few months, covering the environmental and healthcare domains. The cluster plans to scale up Project SAMEER and seed similar pilots across their thematic areas. They are also striving to integrate the 'co-creation' model—where corporates/PSUs, as commercial partners, collaborate with researchers/start-ups to make high TRL technologies market ready—firmly into the ecosystem over the medium term so that

researchers are incentivised to work on 'applied research' as opposed to simply publishing papers. This will also help corporates/PSUs boost indigenous technologies instead of importing basic engineering solutions at exorbitant costs, in line with the vision of Atmanirbhar Bharat.

In the long term, DRIIV plans to widen cluster-to-cluster engagement with countries such as France, Israel, USA etc., mobilise CSR for research and development, and forge impactful partnerships.



News and Events

**First edition of DRIIV's
Annual Conference
RESOLVE—Rendering S&T
Solutions for Atma-
Nirbhar Bharat**



Project Review and Monitoring Committee Meet



Jodhpur City Knowledge And Innovation Cluster (JCKIC)

www.jckif.iitj.ac.in



Jodhpur City Knowledge and Innovation Cluster (JCKIC)



Jodhpur City Knowledge and Innovation Foundation (JCKIF), also known as the Jodhpur Cluster, is operated through a non-profit organisation registered under Section 8 of the Companies Act since March 31, 2021. IIT Jodhpur is the nodal agency for JCKIC, and the cluster works closely with the institute's ecosystem and other research institutions in and around Jodhpur. JCKIF's vision includes enabling innovation for the accelerated growth of the local industry, generating new initiatives in entrepreneurship, and developing solutions for the critical problems of the city of Jodhpur and surrounding areas.



Thematic Areas

- Med-Tech
- Handicrafts and Handlooms
- I-Governance
- Water and Environment
- Thar Designs
- Artificial Intelligence of Things (AIoT) Innovation Hub



Key Projects/Initiatives

Deep-Tech Biodesign Centre

With financial backing from the Department of Biotechnology, Govt, a multi-disciplinary centre, has been established in IIT Jodhpur to train, develop, and transform clinicians and engineers into innovative deep tech leaders in the field of medical and healthcare technology.

Support for Entrepreneurial and Managerial Development of MSMEs Through Incubators Scheme

Four proposals have been submitted under the scheme Support for Entrepreneurial and Managerial Development of MSMEs through Incubators. Scheme's main objective is to promote and support the untapped creativity of individuals and facilitate the adoption of the latest technologies in manufacturing by knowledge-based MSMEs.

Med-Tech Park in Boranada

In Boranada industrial area, Rajasthan State Industrial Development and Investment Corporation Ltd. (RIICO), in association with JCKIC, is considering establishing Med-tech Medical Devices Park, an exclusive zone for the manufacturing of medical devices.



Key Projects/Initiatives

G-Filter for Water

JCKIC and IIT Jodhpur have collaborated to develop innovative wastewater management solutions in Jodhpur, including using potential membrane technologies for wastewater treatment. By using local materials and the skill of local potters, they have developed the G-filter—a gravity-based clay ceramic water filter used to purify water. This innovation can help people in villages become self-reliant in catering to their drinking water needs and prevent them from acquiring water-borne diseases. The G-filter also provides a new functional product for local potters to sustain their businesses.

The purification systems have been installed in government schools of Sirohi, Jhunjhunu, and Jodhpur districts.

CSR Funding from Higher Education Financing Agency (HEFA) for Water Filter

A CSR project of ₹40 lakhs has been funded by the HEFA. The project, based on UF Membrane Assisted Sorption Based Water Purification Systems, involves the design, installation, testing, and commissioning of water purification units in 25 schools in rural areas of Jodhpur district and its neighbourhood.

Formation of the Water Tech Group

The Water Tech Group intends to establish itself as a funding recipient from various industries and organisations to implement sustainable wastewater and environmental pollution management measures. The group will collaborate with government organisations such as IIT Jodhpur, RRSC-ISRO, DRDO, Central Arid Zone Research Institute (CAZRI), Arid Forest Research Institute (AFRI), CPCB, AIIMS, and industries such as the Jodhpur Industries Association.

The Chemical Engineering Department from IIT Jodhpur will lead the formation of the Water Tech

Group and provide technical expertise and guidance in treating of wastewater and sewage, with a focus on recycling and reuse.

Preservation of Local Handicrafts

To assess the current situation of artisans and craft producers in Rajasthan, a two-stage plan involving outreach programmes and trust-building exercises has been devised.

In this regard, need assessment workshops are being conducted with various craft clusters in Jodhpur to understand the challenges and identify local needs and resources. The workshops are being organised with various agencies like NIFT Jodhpur, District Industries Centre, Panipuri Soft, Rupayan Sansthan, handicraft industries, and local artisans. The initiative's next phase will encompass grassroots connect meetings with the artisans at their work units to gain a deeper understanding of their processes.

Implementation of Scheme of Fund for Regeneration of Traditional Industries (SFURTI)

The objective of the SFURTI scheme is to strengthen and upgrade traditional industries by providing them with financial support, infrastructure development, and technological interventions. The scheme aims to enhance the competitiveness of traditional industries, preserve traditional skills and craftsmanship, and generate employment opportunities in rural and semi-urban areas.

Artificial Intelligence of Things (AIoT) Fabrication Facility

The cluster intends to collaborate with the state government to establish a facility that offers comprehensive assistance until the pre-commercial pilot stage for the components, such as sensors, and the system design of the AIoT concept.



Overview of Funds Received

In the financial year 2022–23, JCKIC received funding from the Office of PSA. Additionally, JCKIC secured funds amounting to ₹8.06

crores from the Department of Biotechnology (DBT), Government of India, as well as through other CSR funding sources.



Key Partners



Academia:

- IIT Jodhpur
- AIIMS Jodhpur
- Dr. Sampurnanand Medical College (SNMC), Jodhpur
- Dr. Sarvepalli Radhakrishnan Rajasthan Ayurved University, Jodhpur
- Jai Narain Vyas University, Jodhpur

- National Institute of Fashion Technology, Jodhpur
- Footwear Design and Development Institute (FDDI), Jodhpur
- Sardar Patel University of Police, Jodhpur



Government:

- ICMR-National Institute for Implementation Research on Non-Communicable Diseases (NIIR-NCD)
- Defence Laboratory (DRDO) Jodhpur
- ICAR—CAZRI, Jodhpur
- Regional Remote Sensing Centre-West (RRSC-W), ISRO, Jodhpur
- Arid Forest Research Institute (AFRI), Jodhpur
- District Industries Centre Jodhpur, Govt. of Rajasthan
- Indian Institute of Handloom Technology Jodhpur, Ministry of Textile, Government of India

- Rajasthan State Pollution Control Board (CPCB), Jodhpur & Jaipur
- Jodhpur Development Authority (JDA), Jodhpur
- Department of Information Technology & Communication (DoIT&C), Jaipur
- Jodhpur City Administration



Industry:

- Jodhpur Industry Association





MoUs Signed (2022–2023)

RajCOMP Info Services Pvt. Ltd. (RISL)

Date of signing: 22nd February 2022

IIT Jodhpur and JCKIF have signed a joint agreement with RajCOMP Info Services Ltd. (RISL) to establish an AIoT Innovation Hub at IIT Jodhpur. The primary objective of this initiative is to create an ecosystem that complements the Semiconductor Mission of the Government of India and Rajasthan State policies.

The AIoT Innovation Hub will provide a platform for start-ups, MSMEs, faculty, and students to develop AIoT technologies across various applications. The hub will facilitate the entire process from the design, development, prototyping, testing, and production of AIoT systems at the IIT Jodhpur Tech Park

Contact Base (BanglaNatak)

Date of signing: 15th December 2022

IIT Jodhpur, JCKIF, and Contact Base (BanglaNatak)—a social organisation based in Kolkata—have signed an MoU to collaborate on research related to culture and development, and development of knowledge material. This partnership is expected to foster the exchange of ideas, knowledge, and resources to promote a deeper understanding of culture and its relationship with development.

Electronics Sector Skills Council of India (ESSCI)

This tripartite MoU between ESSCI, IIT Jodhpur and JCKIF has been signed to establish a framework for collaboration between the three parties in order to facilitate skill development in the electronics sector.



Success Stories

Since its inception, Jodhpur Cluster has been actively engaging with the stakeholders in Jodhpur and surrounding regions. Despite a significant amount of time lost due to Covid induced lockdowns and disruptions, the JCKIF has its fair share of success in different verticals.

Local handicrafts and handlooms

The COVID-19 pandemic severely affected the local handicrafts and handlooms industry, especially artisans from unorganised sectors. JCKIF and IIT Jodhpur have organised several need assessment workshops and interaction sessions, particularly with the artisans from the unorganized sectors. JCKIF has been playing a crucial role in preserving the culture of traditional Arts & Crafts by sensitising and creating awareness among the masses about local handicrafts and handlooms, thereby promoting their business. So far, JCKIF has organised three exhibitions which have attracted diverse audiences ranging from school children to faculty members, industrialists and local masses from Jodhpur and nearby areas. The total sales registered in these exhibitions were more than 15 Lakhs, which shows the impact JCKIF is creating in enhancing the lives of craftsmen.

JCKIF has also developed Augmented/Virtual Reality (AR/VR) technology for these local artisans to promote their business using e-commerce to reach the unreached globally.

End users: Local artisans in the Thar Desert region

Smart Traffic Management

JCKIF is actively collaborating with the police authorities in developing smart traffic management solutions for the city of Jodhpur, by using roadside cameras to detect traffic violations such as wrong lane detection and helmetless driving, and to perform traffic volume and speed variation analysis for traffic planning on roads and at roundabouts. In this regard, JCKIF has already completed and demonstrated Phase I of the project, and the next phase of development is underway.

End users: Jodhpur City Administration

G-Filter

The G-filter, developed with the support of JCKIF, is making an impact at the grassroots level. It is made by local Indian potters through indigenous technology using only locally sourced raw materials, clay, and sawdust (plant residue). The flow rate of the G-filter lies in the range of 2–2.5 L/hr, with more than 99% microbial removal efficiency. A typical filter can last up to a year with occasional cleaning. G-filter can be customised for different impurities to solve water contamination problems which differ with location.

The major advantages of G-filter are its low cost, capability of livelihood generation and zero operation energy requirement. A typical G-filter is economical and costs just Rs. 250–400, depending upon size variants. This technology has already been transferred to potters in around 200 villages in Rajasthan.

End users: Local Indian potters

Master's, Ph.D., and Masters-Ph.D. Dual Degree Programs in Medical Technologies (MMT) Programme

During the academic year 2020–21, over 600 applications were received for the Master's, Ph.D., and Master's-Ph.D. dual degree programmes. Eventually, 25 students were enrolled in the programme. In the following academic year, 19 more students joined, bringing the total number of registered students to 44. As of now, three pre-incubates and eight patents have been submitted.

End users: Students

IITJ-BioBlitz's inaugural walk

The inaugural walks for the IITJ-BioBlitz initiative were organised on June 25 and 26, 2022. Participants successfully identified and documented around 15 species of native flora, 26 species of birds, and many other common faunae like garden lizards, monitor lizard, squirrels, Indian gerbil, Chinkara, etc.

End user: Citizens of Jodhpur city region

Future Outlook

JCKIF shall continue working on six identified verticals to complete the tasks undertaken and scale up the work in Handicrafts & Handlooms, Water & Environment, I-Governance, etc.

Medical Technology: To promote and facilitate start-ups developed under MMT programme and establish links with the industries for scaling up the promising technologies, and to establish Common Facilities Center (CFC) involving local institutes and Industries, in collaboration with RIICO, Govt. of Rajasthan and others, the CFC will provide opportunities to all stakeholders in and around Jodhpur and elsewhere to make use of MedTech facilities for advanced research and Product development, etc.

Handicrafts and Handlooms: To facilitate the artisans of the unorganised sector through its unique Direct-to-Customer (D2C) e-commerce platform, where potential customers can experience the products through AR/VR before making an informed choice. This platform would also provide greater visibility to the crafts. JCKIF has already taken the initiative by creating an immersive space and scanning more than 300 artefacts. The actions have been taken to develop an e-commerce platform and will likely be operational in the next six months.

Water and Environment: Scaling up the technologies developed for ultra-filtration membrane and G-filter would be undertaken within and outside Rajasthan. Extension of current and new studies to be pursued are:

- (1) Solar energy-driven desalination and power production unit
- (2) Advanced wastewater treatment at Sangaria

- (3) Research-based strategies to enhance the harvested rainwater quality and quantity in arid regions of Rajasthan

- (4) Identification and assessment of health-impacting air pollution sources

- (5) Design of Granular Activated Carbon (GAC) anchored nanoparticle packed fixed bed filter and its performance under natural groundwater for fluoride removal

JCKIF is initiating a project on reducing the environmental impact of Plastic waste to collect and recycle plastic waste to manufacture chairs, beds and t-shirts for children in orphanages in Rajasthan.

I-Governance: The software co-developed by JCKIF with an industry partner for smart traffic management to wrong-way driving, helmetless driving, etc., will be integrated with the existing traffic system of Jodhpur. Further software development for roundabout traffic analysis and zebra crossing violations is underway. JCKIF would engage with the local police and Jodhpur Development Authority to deploy this AI-based software solution in Jodhpur and other cities of Rajasthan.

Thar DESIGNS: The ongoing studies to understand the ecosystem of Thar desert will be completed, and the leads that emerged will be developed in new research studies.

Other activities: JCKIF plans to launch a series of technical Skill development courses, especially in Electronics System Design & Manufacturing (ESDM) sector. An IP facilitation centre has been established to safeguard the interests of local artisans and Industry.



News and Events

JCKIF along with IIT Jodhpur and other IIT promoted Section 8 companies showcased at Paschimi Rajasthan Hastshilp Utsav at Ravan ka Chabootra, Jodhpur
6th January 2023



A Bone & Horn Craft exhibition was organised by JCKIF and IIT Jodhpur 2nd and 3rd July 2022 in the IIT campus to support artisans and create digital a museum for global marketing of these products.



JCKIF showcased its ongoing activities under the I-Governance vertical to various stakeholders related to traffic management in Jodhpur 11th January 2023



At the UDBHAAS—JAL AUR JEEVAN event, Centre for Sustainable Drinking Water, Handicraft exhibition and Dharohar (Phygital museum) were inaugurated by Hon'ble Minister of Jal Shakti, Shri Gajendra Singh Shekhawat



Citizen Science Program 'IITJ-BIOBLITZ'



Third Advisory Committee meeting of JCKIC
30th January 2023



Project Review and Monitoring Committee Meet



Pune Knowledge Cluster (PKC)

www.pkc.org.in



Pune Knowledge Cluster (PKC)



The PKC was established to bring together academia, research institutions, and industries in Pune and surrounding areas to address the region's challenges using innovative means, scientific knowledge, and highly skilled human resources.

Since its inception in 2020, PKC has fulfilled its mandate by facilitating meaningful partnerships between diverse stakeholders who work together to improve Pune city. PKC's initiatives are implemented through a participatory and consortium approach. By pooling their infrastructural and intellectual resources, organisations that are part of these consortiums have achieved much more than they could have individually. PKC is currently anchored at the Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune.

Over the past three years, PKC has fostered numerous national and international collaborations with various organisations, including academic partners, industry players, research and development institutes, civic bodies, and NGOs. These collaborations have helped PKC achieve its goal of leveraging S&T capabilities to address the region's challenges effectively.



Thematic Areas

- Big data and AI
- Capacity Building
- Health
- Sustainability and Environment
- Sustainable Mobility



Key Projects/Initiatives

Dengue Surveillance Study

Through this project, clinical and non-clinical parameters, as well as seroprevalence of dengue in Pune city, will be mapped. This data will help local authorities and hospitals develop mitigation strategies and a predictive model for vector-borne diseases and build an early warning system for dengue and other diseases.

Antimicrobial Resistance (AMR) Study

Through this project, a molecular surveillance method will be developed for detecting bacterial pathogen sub-groups and associated AMR. The acquired data will provide a clear understanding of prominent bacterial pathogens and their sub-groups in the hospital environment and community levels, helping local authorities and hospitals plan appropriate preventive strategies.

Sustainable Biodiversity Park on Reserve Forest Lands

The project aims to create carbon sinks on degraded reserve forest land, focusing on economic growth, through the sale of Non-Timber Forest Products (NTFPs), biomass and tourism. The park will also serve as a significant source of revenue for farmers, landless labourers, and local government and civic bodies.

Sustainable Water Action Plan (SWAP) for Pune Metropolitan Region (PMR)

The primary objective of SWAP is to establish water observatories that gather, compile, and evaluate information on various aspects of water, such as its availability, consumption, discharge, including sewage and effluents, alterations in land use, climate, and government policies, schemes, and programmes. It also aims to furnish a decision-making support system for all stakeholders, especially government and industrial entities.

Carbon Sink Estimation and Prediction

The project aims to create a computational model for carbon sink estimation for Pune and to contribute towards the carbon-neutral plan of 2030 for Pune city. This will lead towards improved biodiversity & habitats and help city authorities plan data-driven conservation strategies that are based on sound ecological principles.

Carbon Neutral Campus

PKC is working with Samuchit Enviro Tech, a member of the Indian Network on Ethics and Climate Change (INECC), and Climate Collective Pune (CCP) on a collaborative project called the Carbon Neutral Campus Initiative (CNC). CNC hopes to promote climate change discussions and climate action in educational institutes. The project's overarching objective is to motivate and mentor administrations of educational institutes to use low-carbon technologies (preferably carbon neutral) on their campuses. Under this project, carbon accounting for campuses is performed by estimating their carbon emissions (e.g., fossil fuel consumption, electricity consumption) and the carbon sequestration capacity due to green cover. Based on these calculations, recommendations are made by experts for possible new technologies, services, and structural and procedural changes that can be undertaken to further reduce carbon emissions and/or increase carbon sequestration.

ConnecTree

ConnecTree is an AI-enabled interactive platform for choosing, promoting, tracking, and maintaining sapling plantations by citizens, sponsors, and local government bodies. Through this platform, PKC, in collaboration with NGOs, facilitates plantation drives and nature walks to increase awareness about the importance of ecological conservation amongst citizens and sponsors.





Behavioural Nudges

The project aims to encourage citizens to use public transport instead of personal vehicles and to implement nudges, i.e., non-intrusive interventions that guide people toward a desirable action.

Vehicle E-waste Recycling

The project aims to enable the creation of a demo centre for recycling vehicle e-waste and recovery of precious materials at the city level. This will involve identifying novel and scalable recycling technologies and building an organised e-waste collection and recycling system in the city.

Citizen Science: One Million Galaxies

PKC's flagship citizen science project is based on image analyses of galaxy images from the Japanese telescope Subaru. Astronomy enthusiasts are trained by expert astronomers to identify nuanced features of the galaxy images and then provided with an intuitive user interface to mark the peculiarities.

AI Consortium for Biology and Chemistry

The project aims to bring together domain experts from biology, chemistry and AI to address important problems with the help of tech-based interdisciplinary work and to build a model that will contribute towards optimising processes through real-time data analytics.

Wenyan-A Scholarship and Mentoring Programme for Women in Chemistry and Allied Areas

An initiative by the PKC and BASF Chemicals India Pvt. Ltd., the programme was conceptualised to offer funding support, mentorship, and entrepreneurial skill development to deserving women candidates in Maharashtra. The project aims to provide 45 women from marginalised communities with a scholarship and mentorship, at the undergraduate, postgraduate and entrepreneurial levels, for pursuing research or entrepreneurship in chemistry, sustainability, and allied areas.



Teach with Tech

Teach with Tech is an initiative of the PKC in collaboration with Lenovo India. As a two-tier STEM (Science, Technology, Engineering, Mathematics) programme for 6th to 9th grade students and their teachers, this initiative aims to allow them to access and adopt digital content related to Science, Mathematics, and Technology. In turn, this can help students develop an inquiry-based, active, and collaborative learning approach, thus enhancing their 21st-century skills (critical thinking, problem-solving skills, curiosity, etc.). Apart from this, teachers were also empowered with digital pedagogy in teaching.



Overview of Funds Received

In the financial year 2022-23, PKC received funding from the Office of PSA in February 2023. Additionally, PKC secured ₹6.65 crores in funding from external sources. Hindustan Unilever, Lenovo, BASF Chemicals India, and the Cummins India Foundation serve as PKC's primary funding partners.



Key Partners



Academia:

- IISER Pune
- Armed Forces Medical College (AFMC, Pune)
- Maharashtra University of Health Sciences



Government:

- CSIR—National Chemical Laboratory (NCL)
- Pune Municipal Corporation (PMC)
- Pune Smart City Mission
- Pimpri-Chinchwad Municipal Corporation



Industry:

- Hindustan Unilever Limited
- Persistent Systems
- Serum Institute of India
- IBM
- Schlumberger



Others:

- The Rockefeller Foundation





MoUs Signed (2022–2023)

- GAIA The Earth Foundation
- Centre for Development Studies and Activities, Pune
- Centre for Materials for Electronics Technology (C-MET), Hyderabad
- Pune Zilla Parishad
- IORA Ecological Solutions Pvt. Ltd.
- Bhartiya Agro Industries Foundation (BAIF)
- Symbiosis International University (SIU)—Symbiosis School of Biological Sciences (SSBS)
- Gene Path Diagnostics
- Noble Multi-speciality Hospital
- Persistent Systems
- BASF India
- Artpark
- Centre for Cellular & Molecular Biology (CCMB)
- Pimpri Chinchwad Municipal Corporation
- National Centre for Cell Science (NCCS)
- IIIT
- Samuchit Enviro Tech
- Gokhale Institute

Success Stories

One Million Galaxies

PKC's leading citizen science initiative involves analysing galaxy images from the Japanese telescope Subaru. Under this initiative, astronomy enthusiasts receive training from expert astronomers to identify features of the galaxy images and use an easy-to-use interface to mark them. After sensitising amateur astronomy groups and planetariums, a pilot platform was created, beta-tested by enthusiasts, and launched to the public on National Science Day, February 28, 2022. Over 1,000 astronomy enthusiasts from India and abroad have enrolled, identifying over 80,000 galaxy image features. The programme was presented at the State Level Amateur Astronomer's Meet and a multi-stakeholder roundtable on Citizen Science Policy and Practices in India.

End users: Citizens of Pune city region

ConnecTree

So far, over 500 saplings have been successfully mapped on the platform, and more than 3.5 lakh saplings planted by the Pimpri-Chinchwad Municipal Corporation (PCMC) will be mapped in the upcoming months.

End users: Citizens and local government bodies

Carbon Neutral Campus

The CNC initiative has been successfully implemented across two educational institutions in Maharashtra, and the work done under this project has been presented at the 8th IEEE International Smart Cities Conference (ISC2 2022) in September 2022.

End users: Educational institutions in the state of Maharashtra

Success Stories

WEnyan: Scholarship and Mentorship Programme for Women

21 women have been successfully awarded the scholarship under phase 1 of the programme. They have also undergone mentorship from experts in their respective fields.

End users: Women

Teach with Tech

Over 750 students and 350 teachers have benefitted from this programme. This project was also presented at the virtual conference of the Council for Creative Education (CCE), Finland.

End users: Teachers and students

Global Innovation Network Programme (GNIP)

As part of the consortium, PKC has been selected for a funding call to support and strengthen global networks, alliances and partnerships for Danish innovations and research in water. The consortium consists of DHI, Force Technology, Clean Cluster, Water Valley Denmark and IIT Bombay.

Meeting on Green Hydrogen Valley

PKC, in collaboration with CSIR-NCL, DST, and MahaPreit organised a stakeholder meeting for setting up a Green Hydrogen Valley in Maharashtra. 75 participants representing 30+ organisations, including R&D, industries, and regulatory bodies working in the hydrogen space, attended the meeting. The stakeholders demonstrated technology and offtake capabilities for green hydrogen in the Pune region in sectors like transport, fine chemical industry, and data centres.

End users: Industries and R&D facilities

Capacity building courses, workshops and citizen-centric talks

PKC routinely conducts interdisciplinary courses, workshops, and citizen-centric talks. Over the past year, PKC has conducted:

- 7 interdisciplinary training courses and workshops with over 350 beneficiaries
- 26 citizen-centric talks with over 2,400 beneficiaries

End users: Citizens



Future Outlook

In the coming years, PKC aims to scale their existing programmes and build new programmes to leverage the strengths of its stakeholders effectively. The goal is to strengthen partnerships and collaborations

with civic bodies to enable disease surveillance, urban and peri-urban forestry, water management, mobility and green energy infrastructure and capacity building.



News and Events

Smart City & Innovation Roadshow on Smart Sustainable Solutions jointly organised by PKC, the Consulate General of Sweden in Mumbai, the Embassy of Sweden



Five-day Hands-on Residential Training Workshop on Sensor Technology organised by PKC in collaboration with DIAT, Pune



WEnyan scholarship student's visit to BASF Chemicals and Eternis Fine Chemicals



Visit of Dr. Mark Fox, University of Toronto at All India Shri Shivaji Memorial Society's Institute of Information Technology (AISSMS' IOIT), along with Institute of Electrical and Electronics Engineers (IEEE) Pune, Smart City Special Interest group



Project Review and Monitoring Committee Meet



Research And Innovation Circle of Hyderabad (RICH)

www.rich.telangana.gov.in



Research and Innovation Circle of Hyderabad (RICH)



Established in 2017 by the Government of Telangana, RICH aims to bring together diverse stakeholders in the research and innovation space to solve complex local and national challenges. As a nodal agency for the Hyderabad Science and Technology Cluster, RICH facilitates collaborative networks and supports multidisciplinary projects in agriculture, nutrition, health, and waste management. These projects leverage Telangana's local expertise and strengths and offer easy access to funding from relevant central ministries.

RICH is engaged in several high-impact projects, including Agri Nutri-connect, Drones for Better Living, Reagents Consortium, Project Tej, AID-Acceleration Initiative for Diagnostics, ICGA-India Cancer Genome Atlas, Biobanks, and Emerging Technology Pilots in Agriculture. These projects aim to address critical gaps in malnutrition, access to medicines, personalised medicine, AgriTech, and clinical testing assistance for diagnostic start-ups.



Thematic Areas

- Life Sciences
- Food and Agriculture
- Sustainability



Key Projects/Initiatives

Acceleration Initiative for Devices and Diagnostics

The Acceleration Initiative for Devices and Diagnostics (RICH-AID) programme addresses the medical devices sector by identifying and nurturing start-ups in this space for regional, national, and global impact. It provides structured support for clinical advice, regulatory compliance, go-to-market strategies, and access to funding and market access through workshops and mentoring.

Project Tej

In collaboration with Xynteo and Cyient, RICH, through Project Tej, helps start-ups in the med-tech space with clinical validation, usability assessment, business model evaluation, and market access. Their focus on evaluating business models and go-to-market strategies ensures that start-ups are well-positioned to reach potential customers and gain traction in the market.

Scholarship and Mentorship for Women in STEM Education and Careers

In collaboration with Syngene International Ltd., RICH launched the Scholarship and Scholarship and Mentorship Programme for Women in STEM Education and Careers in November 2022 to encourage women to pursue education and careers in STEM.

The programme has selected 25 women students from across India in its first year and will provide them with mentoring and sponsorship for 3–6 months.

UNDP–Data for Policy

In collaboration with Syngene International Ltd., and with support from the Government of Telangana, the Rockefeller Foundation, and the United Nations Development Programme (UNDP), RICH identified and documented 25 climate-resilient practices from three ecosystems in Telangana: Wetlands (in the Nalgonda district), Garden land (in the Mahabubabad district), and Drylands (in the Zaheerabad district). These regions were selected based on their unique climatic conditions, soil types, and crop varieties. The RICH team worked closely with local farmers and agricultural researchers to identify effective practices adaptable to changing climatic conditions.

Green Hydrogen Valley

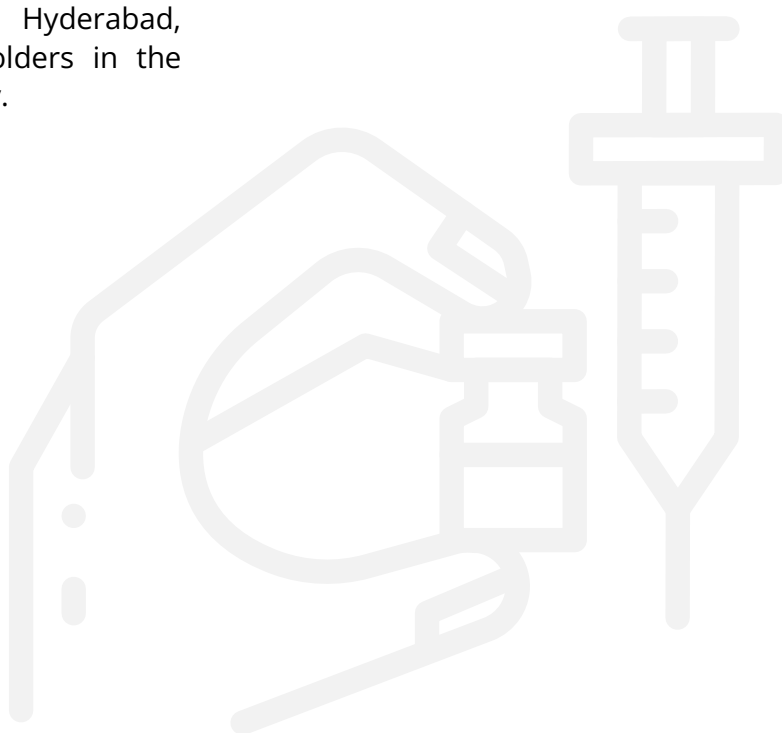
RICH is taking significant steps to bring together the major players in the green hydrogen space in Telangana to establish a Green Hydrogen Valley within the state. To that end, RICH and DST organised a meeting in Hyderabad, attended by various top stakeholders in the ecosystem from across the country.

Demand Response Driven Energy Advancement

An industry and research consortium is being led by Smart Innovation Norway (SIN) in collaboration with RICH, Indian Institute of Management Ahmedabad (IIMA), BSES Yamuna Power Limited (BYPL), BSES Rajdhani Power Limited (BRPL), and Noida Power Company Limited (NPCL). They will be working on demonstrating demand-side energy management. The consortium, funded by The Norwegian Ministry of Foreign Affairs, is one of the many projects under the Indo-Norwegian Task Force on Energy.

Mission 10X: DeepTech and Med-Tech

Mission 10X is a collaborative initiative of the Telangana Incubators and Accelerators group to support early revenue stage start-ups by providing market access, corporate connects, and funding opportunities for scale-up.





Overview of Funds Received

In the financial year 2022–2023, RICH has raised more than ₹17.33 crores for various projects, while approximately ₹3.4 crores are in the pipeline for future projects.



Key Partners



Academia:

- Indian Institute of Technology (IIT), Hyderabad
- International Institute of Information Technology (IIIT), Hyderabad
- Indian School of Business (ISB)
- Hyderabad University



Government:

- CSIR-CCMB
- Centre for Materials for Electronics Technology (C-MET)
- CSIR-Indian Institute of Chemical Technology (IICT)
- Ministry of Agriculture & Farmers Welfare, Government of India
- Emerging Technology Wing, Government of Telangana



Industry:

- Cyient
- Xynteo
- Ramky Group
- Syngene International
- Biocon Foundation



MoUs Signed (2022–2023)

Indian Institute of Chemical Technology (IICT)

National Institute of Pharmaceutical Education and Research, Hyderabad (NIPER)

Aurobindo Pharma

SIPRA Labs

To identify, nurture, incubate, and commercialise the IP from Research and Academic Institutions for encouraging innovation and entrepreneurship, creating jobs, and benefitting society



MoUs Signed (2022–2023)

Medtronics Labs	To foster a collaborative environment to strengthen research and innovation ecosystem activities of both the organisations
NATCO	
St. Pauls College of Pharmacy	
Mazumdar Shah Medical Foundation (MSMF)	
LEPRA–Blue Peter Health and Research Foundation	
Xynteo	To collaborate to achieve the objective of strengthening the healthcare innovation ecosystem in India, and support med-tech innovators to improve their access to the last mile
Cyient	
Malla Reddy Health City	To explore opportunities for offering structured clinical validation support to start-ups in health-tech and med-tech space via the Project Tej platform
Kauvery Hospitals	
Fernandez Hospitals	
NICE Foundation	
L.V. Prasad Eye Institute BioNEST	
Smiline Dental Hospitals	
MNR Medical Foundation	
Vaatsalya Hospitals	To foster a collaborative environment to support the start-ups under the AID programme
I-Venture@ISB	
National Institute of Micro, Small and Medium Enterprises (NI-MSME)	To establish a training centre on clean technologies as a part of the Centres of Excellence (CoE) in clean technologies and promote entrepreneurs in the areas of life sciences, agriculture, and sustainability
Biocon Foundation	To support the scholarship and mentorship programme for women in STEM education and careers
Atal Community Innovation Centre-Chaitanya Bharathi Institute of Technology (ACIC-CBIT)	To promote entrepreneurship amongst unserved and underserved communities in Telangana



MoUs Signed (2022–2023)

Vaagdevi Incubation and Business Accelerator (VIBA)	To provide assistance in developing its R&D and innovation ecosystem
The Agri-Collaboratory	To accelerate the development of an open-source information sharing ecosystem
National Institute of Nutrition	To collaborate and work towards nutritional intervention strategies amongst the underserved communities and sections of the society
International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)	To foster a collaborative environment to actively facilitate the process of taking the research to market and create an innovative and entrepreneurship environment in the Food and agriculture ecosystem
Indian Institute of Millet Research	To advance development in millet food production by facilitating market research
Aranya Agricultural Alternatives	To enable implementation of various farming projects, support and upskill farmers with the latest technologies, and assist start-ups with technology validation
Samunnati Foundation	To provide start-ups supported by Samunnati Foundation with assistance in product and technology validation, mentorship, and commercialisation
Indian Centre for Social Transformation (CST)	To onboard agritech start-ups on the Kisan Mitra platform, assist with product commercialisation, and facilitate link-up with funders and incubators, along with creating a database of start-ups and Farmer Producer Organisations (FPOs) and extending technical support regarding product evaluation and development of market plans
AgHub-Professor Jayashankar Telangana State Agricultural University (PJTSAU)	To establish a close partnership for supporting innovators, start-ups, students, and women entrepreneurs in the field of agriculture and food
Social Alpha	This MoU will allow both RICH and Social Alpha to better support science and technology start-ups in Telangana by fostering an environment of collaboration within the start-up ecosystem. It will also allow both organisations to act as ecosystem partners for each other in the future

Success Stories

Acceleration Initiative for Devices and Diagnostics

The RICH-AID programme has successfully supported 27 start-ups through three completed cohorts. These start-ups have achieved significant success, with many receiving prestigious awards and recognition through the programme's support.

The AID programme has also onboarded over 35 mentors with multi-disciplinary expertise to support start-ups. Finally, associated start-ups have raised over ₹5 crores in funding through the AID programme's support. This funding has enabled these start-ups to continue their development and growth. RICH has also onboarded 15+ hospitals which act as testbeds for clinical validation of start-ups' products.

End users: Start-ups and entrepreneurs

Project Tej

So far, Project Tej has supported nine start-ups and onboarded 15 hospitals. 5 studies are ongoing under the programme, and four have already been completed.

End users: Hospitals

Scholarship and Mentorship Programme for Women in STEM Education and Careers

Through the Women in STEM programme, 25 women students from across India pursuing various disciplines in STEM fields, have been selected and placed at top research institutes in Hyderabad like the CCMB, Dr. Reddy's Institute of Life Sciences (DRILS), Dr. Reddy's Laboratories and Bharat Biotech.

End users: Women in STEM

Mission 10X: DeepTech and Med-Tech

The first cohort of start-ups has graduated from the Mission 10X programme, after receiving guidance on market access strategy from resident mentors at RICH for three months. Post graduating from the programme, the start-ups have pitched their innovations to leaders from VC firms and corporates as part of the demo day organised by Telangana State Innovation Cell (TSIC), RICH, T-Hub in association with IKP Knowledge Park, CIE IIIT Hyderabad and Atal Incubation Centre-CCMB.

End users: Start-ups and entrepreneurs



Future Outlook

RICH's future outlook is focused on driving innovation in several sectors through various initiatives and projects. The organisation is committed to creating a robust innovation ecosystem that will position Hyderabad as a leader in research and innovation in the region.

One of the key initiatives that RICH will be focusing on is One Health. The goal is to build a Hyderabad One Health Platform - a network of practitioners and scientists who will evaluate the value of the shared environment, biodiversity, and livestock monitoring for pathogens in the changing milieu of a large and active Indian city. This approach spans multiple disciplines and will result in the development of an integrated health system with comprehensive and real-time databases and analytical tools for predicting risks to human and animal health.

In the food and agriculture sector, RICH will focus on scaling up operations of agritech start-ups in Telangana through the Agri Sandbox initiative. This programme aims to understand and remove inhibitors to growth, advance key policies and regulatory issues, and enable innovation, which can enhance start-ups' competitiveness and positively impact the agriculture sector in the state.

RICH will also be working on several other initiatives, such as setting up a Green Hydrogen Valley in the region to promote the production and use of hydrogen as a clean and renewable energy source, developing a project for demand-side energy management, establishing CoEs on clean energy and health tech commercialisation, and creating avenues for stakeholders through capacity building initiatives such as Women in STEM and Mission 10X.

Finally, RICH is committed to international collaborations and seeks partnerships with leading research institutions and companies to create a robust innovation ecosystem that positions Hyderabad as a leader in research and innovation in the region.





News and Events



Launch of the Scholarship and Mentorship Programme for Women in STEM Education and Careers

The Green Hydrogen Consortium Stakeholders' Consultation Meet Organised by RICH



Launch of the Mission 10X Programme-A 6-month joint scaleup program for early-stage research connected start-ups

Project Review and Monitoring Committee Meet



Synergy Between Strategic Alliances Division and S&T Clusters

Support received from the Office of PSA's Strategic Alliance Division

The Strategic Alliances Division of the Office of the Principal Scientific Adviser (PSA) to the Government of India (GoI) promotes collaboration at scale among India's scientific research and development ecosystem, start-ups, and a wide range of partners, including industry, government agencies, multilateral and philanthropic organisations, and state governments.

The Division sources demand from partner organisations and communicates the demand to Indian academic and research institutions, and start-ups. This facilitates cutting-edge research and development (R&D) of innovative and cost-effective technologies. The Division also leverages the opposite approach.

It proactively sources R&D proposals from six National Science and Technology Clusters to mobilise support from partner organisations. R&D activities catalysed through these partnerships, in turn, strengthen the solution-building capacity in the country and globally.

Thus, over the years, the Strategic Alliance Division of the Office of PSA has been successfully facilitating multistakeholder partnerships with academia and start-up ecosystem for emerging technologies within the S&T Clusters and bolstering innovation for social impact.

The S&T Clusters have received huge support from the Office of PSA's Strategic Alliance Division:

Bhubaneswar City Knowledge Innovation Cluster

Industry Partner	Title of opportunity/Project Name	Type of Funding	Cluster Thematic Area	FY
	Rice Husk to Cellulose	Grant	Waste to Value	2022-23
	Eco-friendly Polymer-based Feminine Hygiene Products for Tribal Blocks of Odisha	Grant	Health	2023-24
	IHF launched Quest 2022–Innovations for Infectious diseases	Partnership	Health	2022-23
	HD Scholarship and Fellowship Program—MEDHA	Grant	Health	2022-23
	Desilting Project (15 Water bodies)	Grant	Waterbody rejuvenation	2022-23
	To Restore promise of water (3 modules)	Grant	Waterbody rejuvenation	2022-23

DRIIV: The Delhi Cluster

Industry Partner	Title of opportunity/Project Name	Type of Funding	Cluster Thematic Area	FY
 mongoDB	Developing a Scalable, NDHM compliant, and AI-enabled Infectious Disease Tracker	Grant	Health	2022-23
 blue planet FOUNDATION	Plastic Waste to Benches	Grant	Waste to Value	2022-23
 Biocon Foundation EMPOWERING COMMUNITIES	Developing a Scalable, ABDM Compliant Antimicrobial Resistance Tracker	Grant	Healthcare	2022-23
Power Distribution Corporation Ltd. (Blue Planet)	Collective responsibility drive	Grant	Waste management	2022-23
Blue Nudge	PSA Blue Planet Warrior fellowship	Grant	Environment Education	2022-23

Research and Innovation Circle of Hyderabad

Industry Partner	Title of opportunity/Project Name	Type of Funding	Cluster Thematic Area	FY
 Biocon Foundation EMPOWERING COMMUNITIES	Women in STEM: Scholarship and Mentoring for Women Students and Researchers	Grant	STEM	2022-23
 tac THE AGRI COLLABORATORY	Project proposal on agri-nutri connect as well as other work on agriculture in general	MoU signed	Agriculture	2022-23

Jodhpur Cluster

Industry Partner	Title of opportunity/Project Name	Type of Funding	Cluster Thematic Area	FY
BTheue Planet	Providing 760 school benches, 950 bunk beds, and 3800 t-shirts made from plastic waste to 38 Government Children Care Institutions in Rajasthan	Cash Grant	Waste to Value	2022-23

Pune Knowledge Cluster

Industry Partner	Title of opportunity/Project Name	Type of Funding	Cluster Thematic Area	FY
 The ROCKEFELLER FOUNDATION	Dengue Surveillance	Grant	Health	2022-23
 BASF We create chemistry	Platform for Gamified Learning in Chemistry & STEM Education	Grant	STEM	2022-23

Project Review and Monitoring Committee for S&T Clusters

The activities of the S&T Cluster are periodically reviewed by the current Project Review and Monitoring Committee (PRMC) constituted by the Office of the PSA, with members from academia, research institutions, and industry.

The emphasis is placed on the Clusters undertaking end-user-based, impact-driven, and collaborative R&D projects.

Dr. Swati Basu **Chairperson**

Former Scientific Secretary,
Office of the Principal
Scientific Adviser to the GoI

Dr. Dinakar Kanjilal **Member**

Former Director,
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BITS Pilani Campuses Former
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Technology Delhi (IIT-D) (2016–2021)
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Prof. Anil K. Gupta **Member**

CSIR Bhatnagar Fellow 2018–21
Founder, Honey Bee Network,
SRISTI, GIAN & NIF Visiting Faculty,
IIMA & IITB and Academy Professor,
ACSI

Shri Anand Nayak **Member**

Independent Director,
ITC Board

Prof. Kalpana Balakrishnan **Member**

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