2022-23 ANNUAL REPORT ON K-DISC PROGRAMMES

Kerala Development and Innovation Strategic Council (K-DISC)

Innovation Tower, India Heights Building, Women's College Rd, Vazhuthacaud, Thiruvananthapuram, Kerala 695014

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Introduction

Kerala is a forerunner in terms of human development and good governance. Even so, Kerala is facing challenges of providing holistic health care, employment-oriented skilling, enhancing quality of education, high quality social security, continued food and nutrition security with a pro-poor bias, gender justice and inclusion of outliers, all within severe fiscal constraints. The state also must address decades of infrastructure deficit and make rapid strides in cutting edge areas of knowledge revolution and tourism. In the above context, innovation emerges not only as an engine of prosperity, competitiveness and an ingenious mechanism of real-life problem solving but as the act of creating extraordinarily new values in unusually original ways.

Launched on March 24, 2018, the Kerala Development and Innovation Strategy Council, (K-DISC) pursued the mandate of promoting innovation in the state. Kerala State Innovation Council was established as a unit of the National Innovation Council for fostering activities relating to innovation in the state as a part of the innovation decade program of the Government of India. This was revamped as K-DISC subsequently. This was revamped as K-DISC subsequently. K-DISC was originally constituted as a Council guided by a six-member advisory council with Dr. K. M. Abraham, former Chief Secretary to Government of Kerala as the Chairperson. The Council consisted of six eminent persons of repute in Science, Innovation and Technology.

K-DISC aims at bringing out path-breaking strategic plans that reflect new directions in technology, product and process innovations, social shaping of technology and creating a healthy and conducive ecosystem for fostering innovations in the State. K-DISC had undertaken many activities in promoting innovation in government, launching its flagship initiative for promoting young innovators and promoting social inclusion among marginalised.

Today, K-DISC is the Kerala Government's nodal agency to facilitate Kerala's transition to the Knowledge economy apart from making Kerala an innovation hub. K-DISC structure was revamped in 2021, when it was registered as a society with the Chief Minister as the Chairperson, Finance Minister as Vice Chairperson and Ministers for Industries, Higher Education, Labour and Skills and Agriculture as members. The Governing body consists of Vice Chancellors of the major Universities in the state and experts from various walks of life. The control and management of K-DISC vests with the Planning and Economic Affairs (Development and Innovation) department headed by the Executive Vice Chairperson of K-DISC and Ex-Officio Secretary Government and Member Secretary, K-DISC and Ex-Officio Secretary to Government reporting to the Honourable Chief Minister.

Vision

K-DISC was set up with a vision of "A competitive and inclusive Kerala through creation of a healthy,conducive ecosystem for transformative and bold innovations through new directions in technology, product and process innovations".

Mission

The mission of K-DISC can broadly be classified as holistic and quality human development in Kerala, a knowledge-centred, technology based local economy with global connect and enhanced inclusion, participation and self-reliance through cutting edge knowledge and technology.

The following are the major divisions in K-DISC:

- Planning, Competency Development, and Innovation System
- Innovation Technologies
- Social Enterprises and Inclusion
- Knowledge Mission

Planning, Competency Development and Innovation System

Young Innovators Programme

1) **Introduction**

   Young Innovators Programme (YIP) is the flagship programme of K-DISC which aims to empower future innovators to imagine new products, services, or models to meet emerging requirements, unarticulated needs, or existing market and social needs of the society more effectively through specially designed challenges. The motto of the programme is "Democratisation of Innovation".

2) **Objective**

   The objective of the program is to develop an ecosystem for identifying youth with bright minds for solving real life problems, mentoring them, attaching them to research institutions/ partner institutions with funding for one to three years and help them build a career around the innovations, researching, re-discovering, incubating and accelerating the innovation.

3) **Methodology**

   The program aims to give students an experience of the innovation cycle from conceptualisation to a final product or a process to school and college students. The students participate in teams of 2 to 5 members each. The program has three levels of evaluations followed by trainings which enable the teams to improve their idea. Selected candidates will then go through mentoring from identified experts over a period of three years or till they exit the program. Funding is given to the teams through periodic assessments called innovation challenges.

The evolution of the platform over the last five years can be outlined through the below diagram

2018	2019	2020	2021	2022
Single form based application for Idea submission of talents identified from past competitions in the state through a predominantly offline process.	Expanding to a formal open notification process with a database based structure covering groups of students in various types of academic and research institutions Form expanded to institution, facilitator and mentor registration. Challenges administered electronically.	Migrated to platform with focus on Institution, Idea , facilitator registration Mentor-mentee interactions made electronic. Moodle based learning management system provided for trainings. Logins and validation enabled	Platform expanded to suit evaluation online. Pre-registration after a Voice of Stakeholder training administered online. Integration with AI Chatbot for query handling Integration with WhatsApp for communications	Platform evolved with mobile app launch and focus on separate schemes for education departments, grouped category wise Focus on continued engagement through app Targeting large scale adoption using elastic cloud based back end.

The entire program is driven using the online platform which integrates various components and tracks the end-to-end lifecycle of each idea. Furthermore, WhatsApp integration, AI based chatbot, helpdesk and call center support have been integrated to ensure a holistic experience to the users.

The architecture for the programme linking the innovation platform to the various stakeholders and processes is provided below. As could be seen there are three components seen as three hexagons viz. the Digital idea platform, Mentor-Mentee platform and the YIP challenge platform. The Innovation sandbox is another important component the Learning Platform.

The Mentee journey starts through the Digital Idea Platform. It takes the students through a structured journey of registering, forming a team, attending a training on Voice of Stakeholder (Design Thinking Fundamentals), doing a Vos Survey and submitting the idea.

The platform is responsive and can support various mobile/tab and web views.

The digital idea platform is integrated with an AI chatbot which can respond to most of the queries. Any escalation goes to the help desk from where a human interaction is initiated through an agent.

All students are connected to their respective institution. This is done through an online institution registration process. The process involves registration of Institution by the Head of Institution. Complete details and point of contact in the institution are available online.

Students who are registering can choose facilitators from their institution online. Any idea which is submitted is to be approved by the Institutional Point of Contact and the Head of Institution.

Evaluation of the submitted ideas in each stage is an online process. The evaluator is assigned and is given individual logins. These evaluators then go through the evaluation as per a standard format. The results are stored online and the teams are shortlisted based on the selection criteria.
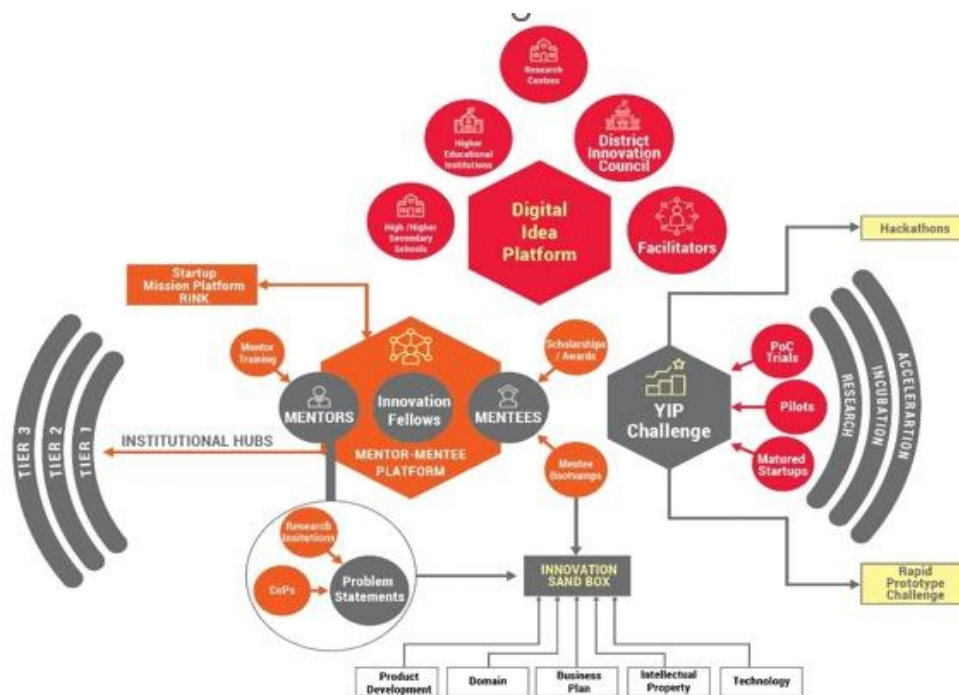
Learning Platform: Learning is an integral part of the Young Innovators Programme. Teams are encouraged to learn and implement the concepts in refining their ideas at each stage. Students undergo online programs in Domain, Fundamentals of Business Planning, Intellectual Property, the Technology aspect relevant to the solution, Rapid Prototyping. The entire program is managed through a customized version of Moodle which has a single sign on. Course submissions are tracked and feedback is provided at each stage of the process. Successful teams are awarded a course completion certificate at each stage.

Mentor Mentee Platform: Students who are successful are finally onboarded to the mentor mentee platform which tracks their project through various stages. The platforms architecture is unique as it facilitates cross domain interaction as well as encourages teams to reach out to a pre listed mentor pool for support.

The platform also provides a continuous status update for the core team to be aware of the status and provide support as required.

AI Chat Bot: A Chat bot was integrated to the platform to handle the queries. The chat bot is fed data on the programs and act as an one stop shop for all queries. There is an inbuilt escalation process to redirect to an human agent when required.

WhatsApp Bot: A green ticked WhatsApp account was integrated for YIP. This enabled near instant reach out to students and facilitators to update on the status of their

application and the way forward. Two way communication was also enabled using a bot and agent integration.

Communities of Practice: One of the critical elements of the YIP ecosystem is the Communities of Practice. This is a group of experts with interests in the identified thematic area who willingly take part in activities to support the eco system. To facilitate this a platform – tribe.so was integrated as a white-labelled offering – "nuthakam" in the eco system. This enables constant interaction within the community in a managed environment.

Mobile App: The YIP platform especially the idea submission stage is predominantly used on mobile (75% as of 2022). In order to facilitate that and also reduce the cost of messaging, the platform has transitioned to a mobile based ecosystem for idea submission, institution and facilitator registration. The app was launched on December 15th for YIP 5.0 and has had 18200 organic downloads by students in one month. Further evolution of the platform to support evaluation and mentoring is also envisaged online.

The Innovation Ecosystem in the state is represented pictorially below and is a critical component of the Triple-Helix promoting innovation in a region. This is concealed within the innovation architecture The digital idea platform is the window of the YIP innovation ecosystem. The institutional hubs link the mentees to the academic and research institutions in the state designated as institutional hubs in a hub and spoke arrangement.
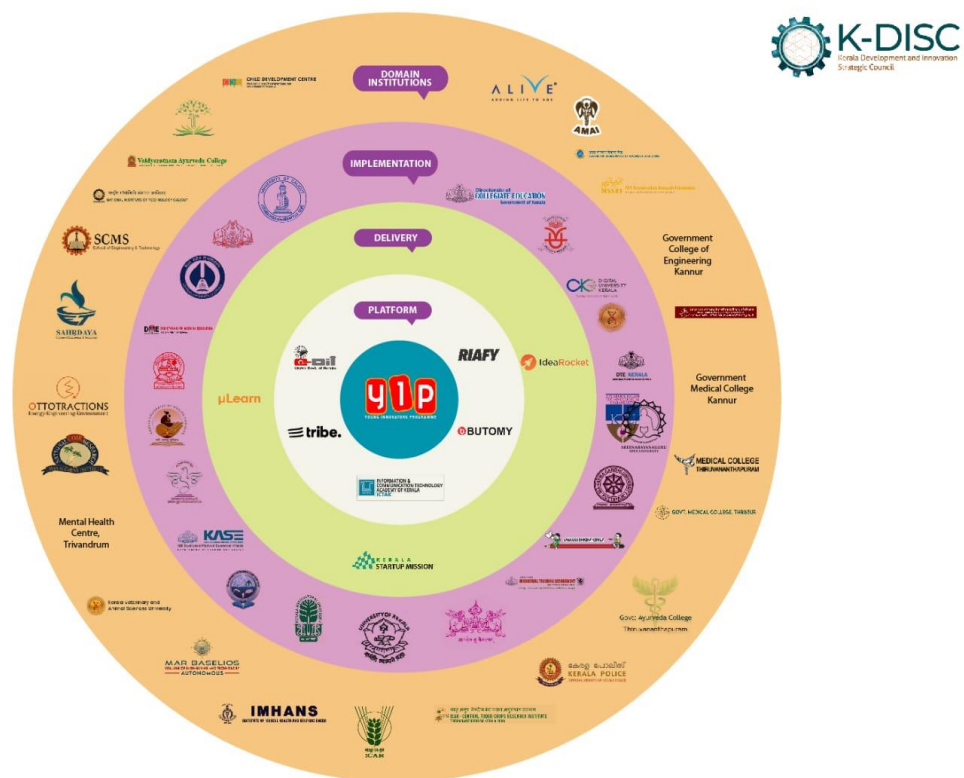
4) Achievements

| Description	YIP 2018	YIP 2019	YIP 2020	YIP 2021	YIP 2022 (Estimate)
Pre-Registration	1320	3950	10112	102512	120000
Teams Registered	1320 Single member teams only	1021	2826	13043	
Idea Registration	1320	1021	2846	9404	36000
Mentor Registration	78	84	108	Not yet started	
Domain Mentors		86	110	Not yet started	
Domain Institutions		11	41	35	
Institution Registration		1143	1589	5974	7374
Facilitator Registration		1394	37937	19012	23468
Mentor Mentee Interactions			1 Per Month (180 till date)	Not Yet Started	
District Level Winners			234	Not Yet Started	
State Level Winners	22	102	96	Not Yet Started	2000
AIT Applicants	55 (After Preliminary)		51	Not Yet Started	
AIT Winners	8	16	22	Not Yet Started	100
NIT Applicants	61 (After Preliminary)	34	Not Yet Started	Not Yet Started	
NIT Winners	14	8	Not Yet Started	Not Yet Started	100

Manchadi – Teach Maths for Kerala

1) Introduction

The Manchadi Programme aims for a more result oriented and problem-solving society in Kerala through wider and more explicit application of mathematical knowledge in real-life. It will achieve this goal by setting up Community Math Labs (CML) at the grassroots across Kerala.

2) Objectives

The emphasis of the programme is on developing foundational mathematical understanding. The focus is on developing number sense (samkhya dharana) based on which children can flexibly solve problems rather than following a specified procedure.

3) Methodology of Implementation

Manchadi process and flow
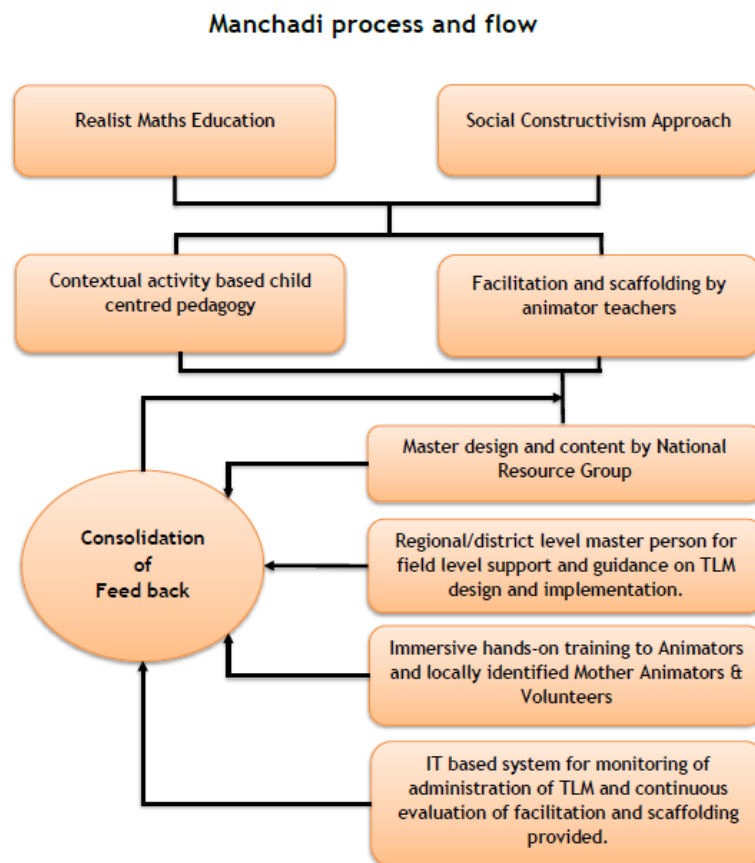
- Each classroom activity is centred around a problem that is engaging for children, where the teacher supports the development of children's thinking through posing appropriate questions and by supporting conversations within

the classroom. The problems and activities are designed and adapted to the specific context of the children in the school.

- This also requires introducing assessment practices that are aligned to this pedagogical approach. Reports based on detailed observation of children during regular classroom activities as well as during planned evaluation activities form the basis for assessment. The plan for classroom activities is adapted and modified based on this process.

- Introducing such interactive classroom practices required intensive orientation workshops as well as sustained interactions both with the Animators and between Animators and Amma teachers in each school. The kendra koodarams played an important role in this orientation process, where Animators could observe actual classes where such an approach is being practiced.

4) Achievements in the period

- One of the major new developments in the current period has been the extension of the Manchadi methodology into large classrooms with the establishment of koodarams in 20 Model Residential Schools under the aegis of SC & ST departments. It has been observed that activity-based innovative processes could be effectively implemented in these situations also. This has involved pedagogic orientation of the amma teachers in conducting the activities as well in planning for a combination of whole-class and small-group activities in each class. This combined approach is in fact crucial for effectively dealing with the multiple levels natural in any classroom.

- The MRS schools have provided a good initial context for communicating with the teacher community. In many MRS, conversations with interested teachers have started about the Manchadi classroom processes. Often this has been to understand children's continued interest in the Manchadi classes. This grounded communication can be planned to be developed into studying the conceptual basis for the activities in the future. Especially noteworthy is the development of conceptual basis for fractions.

- There have been important developments related to the documentation of children's responses as well for the orientation of amma teachers. The Documentation of children's responses has been streamlined to deal with larger classes. Video documentation and daily observation reports have emerged as important tools for effective conversations with amma teachers; for providing feedback as well as for planning of classes.

Mazhavillu – Teach Science for Kerala

1) Introduction

Mazhavillu– Teach Science for Kerala Programme aims at preserving and strengthening the public education system of Kerala and has unequivocal focus on improving the quality of education.Mazhavillu – Teach Science for Kerala is a sequel to Manchadi. The initiative is based on the concept of integrated science learning as a continuum, with an emphasis on enhancing scientific awareness through practical activities and analysis. As part of the initiative, Five Community Science Labs (CSL) were established

2) Objectives

The objectives of Mazhavillu as envisaged in the project proposal are as follows:

a. Bringing in an element of history of science in science teaching.
b. Imbibing scientific temper and spirit of enquiry in children.
c. Develop critical thinking and analytical abilities in children.
d. Strengthen awareness of frontiers of science through experimentation and through open ended problem solving for innovation and exploration.
e. Demonstrating the method of science through experimentation and through open ended problem solving for innovation and exploration.
f. Application of the method of science to human problems and problems at the society-nature interface and society- science interface.

A Project Management System Bitrix 24 is developed and put for use by K-DISC as part of system support for Project Management and creating a repository of learning materials which can also handle audio, video and multimedia materials.

The additional themes in Mazhavillu are Astronomy, RaspberryPi, Scientific temper, Robotics, and streaming of science films.

3) Methodology of Implementation

I. Workshops and meetings of Resource Groups

A methodology of thematic integration has been developed for Mazhavillu. The learning objects for the classes 3 to 7 have been structured theme wise

a. Environment, Agriculture and allied sectors.
b. Kerala Political, Socio-Economic and cultural contexts.
c. Earth science, Space exploration, Transport and Communications.
d. Fuels, Energy and Structure of Matter.
e. Nutrition, Health, Sanitation and Safety.

II. **Material development and documentation**
The text book content in the social science and general science text books need to be restructured around the five integrated themes.

III. **Capacity building**
Several models of thematic instruction were proposed. One of them is the model of thematic instruction which is brain compatible and grounded in the biology of learning. The various methods of effective thematic teaching are imbibed and a strategy of engagement worked out.

4) **Achievements in the period**
- Mazhavillu classes are going on the following centers
  o Government Arts College, Thiruvananthapuram
  o Maharajas College, Ernakulam
  o Kerala Forest Research Institute (KFRI), Peechi, Thrissur
  o Integrated Rural Technology Centre (IRTC), Mundur, Palakkad
  o Brennan College, Kanuur
- Students from class III to VII are attending the classes. Socio economic survey of Mazhavillu students was completed. The students are grouped as junior, senior and elder based on the initial assessment.
- Teaching Learning Materials are prepared for these three groups based on the learning objectives of the themes selected. Mazhavillu theme based documents are available in two versions.
- A workshop was conducted at KFRI during August 08 – 10, 2022 to finalise the thematic integration. The workshop evaluated and finalized the content prepared for the six themes in Mazhavillu. The workshop further prepared the concept map for integration.

District Innovation Council (DInC)

1) **Introduction**

The District Innovation Council (DInC) is the district arm of Kerala Development Innovation Strategy Council (K-DISC) to promote innovation in the State.

2) **Objectives**
- To make DInCs hubs for Innovation Management at the district level.
- Build an innovation ecosystem comprising of schools, training institutes, Polytechnics, engineering colleges, research centres and centres of excellence at the district level.
- Complete awareness and support for young talent in the various educational institutions about innovation programmes such as Young Innovation Program (YIP) and other challenges.

3) **Methodology of Implementation**

An innovation ecosystem is sought to be created in the state by K-DISC through local and district level partnerships with academic/research institutions, innovators, local governments, private enterprises etc.

It is proposed to organise the following activities in districts as a part of the ecosystem building

- Registration of educational institutions, research institutions in the district as a part of the Innovation Ecosystem in the district
- Registration of National institutions as Centres of Excellences in the district
- Registration of nodal officers, facilitators & mentors in educational, research & national institutions as a part of the Innovation Ecosystem in the district.
- Registration of ideas as a part of the annual Young Innovators Programme challenges by students in the schools and researchers in the research institutions which are part of the innovation ecosystem
- Facilitate mentee, mentor and facilitator boot camps in districts strengthening the ecosystem further
- Organise road shows for innovation promotion linking academic institutions, research centres and centres of excellence with K-DISC.
- Organise district level trainings on innovation.
- Create a pool of mentors at the district level and to link the mentor pool with the young innovators through the mentor-mentee platform of K-DISC.
- Identify local innovations and disseminate successful innovation examples for adoption.

- Integrate local governments in the district and institutions, functionaries, and departments Kerala at the district level with the Kerala Innovation Fund.
- Stimulate innovation by supporting partnerships among colleges, local governments, Departments, the Centres of Excellences and Research Centres in the district for learning and innovation proactively with K-DISC.
- Encourage small and medium enterprises to submit proposals for technological and social innovation that will lead to significant commercial and public benefit proactively with K-DISC.

4) Achievements in the period
The District Innovation Councils have been expanded adding chairpersons of the Municipalities and Mayors. DInC is assumed to take a wider role.

One District One Idea (ODOI)

1) **Introduction**

   ODOI is an innovation challenge programme for manufacturing clusters, medium and micro-enterprise clusters. Innovation and technology have been identified as the primary differentiators that can take the enterprises as well as the clusters to non-linear non-incremental growth.

2) **Objectives**

   The programme aims at:
   1. Organisation and development of clusters.
   2. Development of networks of MSMEs.
   3. Development of strategic linkages between MSMEs and academic institutions, promoting innovation and strategy interested in working with MSMEs on cluster development.

3) **Methodology of Implementation**

   "One District-One Idea"-MSME development challenge will aim to identify promising Innovations in MSME Clusters. The Challenge will be open under two categories viz. Manufacturing Clusters which shall include a minimum number of twenty registered MSME units and Micro-Enterprise Clusters including Handicraft Clusters, Handloom/ Power-loom Clusters, Other Traditional Industries and Service Clusters which are aggregations of household enterprises. Handloom/Power loom Clusters shall have a minimum of 200 looms and handicraft, traditional industries and service clusters shall have at-least 20 units in each cluster.

   The MSME clusters participating in the challenge shall come up with an action plan that details the strategic innovation plans and the required appropriate interventions. Such Cluster proposals will have the collaboration of academic centre/business school partners. Evaluation of the proposals will follow based on the decided framework, with emphasis on Innovation and Technology along with other weightage considering factors.

   The challenge response submission and follow up activities are to be implemented through a centralised ICT platform of K-DISC. The District-wise Innovation cluster short listing and Academic Institution short listings are done, the next set of major activities would be to connect the clusters with Institutions, offer strategic linkages, preparation of the Innovation plan, carry out Innovation Challenges and start to implement the Challenges. The Digital University will be the key knowledge partner in the programme and in its implementation.

Overall Scheme of ODOI-MSME Innovation Clusters

4) Achievements in the period

- 63 Clusters have been assigned to the 61 Mentor Institutions.
- Funding support has been initiated to 55 Mentor Institutes towards the preparation of the ODOI action plan.
- The ODOI State Core Meetings were conducted on 08.06.2022 and 20.09.2022 chaired by Hon'ble Minister for Industries, Law and Coir Shri P Rajeev.
- The ODOI portal for data capturing was demonstrated and the ODOI Challenge was officially announced.
- Innovation Project Mentor Development (IPMD) training programme for Mentor Institutions of ODOI Programme was conducted on June 20 & 21, 2022 by Digital University of Kerala (DUK).
- An ODOI workshop was organised on 4 Nov 2022 to connect Mentor Institutions and DIC officers. Mentor Institutions presented the problems that were mapped with various schemes and gap were identified for new schemes to solve problems of clusters that were not covered under the regular schemes.
- MoU was signed between EDII and KDISC on 11 January 2023 subsequently the evaluation framework was finalised taking inputs from EDII and DUK. The role of EDII will be aid in setting Evaluation frameworks, strategic guidelines, innovation Interventions at Clusters, along with capacity building for K-DISC officials and Mentor Institutes in handholding clusters.

One Local Government One Idea (OLOI)

1) **Introduction**

   The OLOI programme is intended to develop a sustained mechanism for promoting innovation in local governments. The Programme is expected to encourage development of ideas to at local government level, identify the best idea and take it forward for implementation. The programme will be operationalized through partnerships between LSGIs, academic/research institutions, Government Agencies, private enterprises, and experts.

2) **Objectives**

   The overall objective of the programme is to foster sustainable Local Economic Development and bring about social transformation in LSGIs of the state. In the process, it is aimed at developing a system for identifying best practices and translating them into innovations at the local government level, working jointly with LSGIs.

   The Programme is expected to encourage development of ideas to at local government level, identify the best idea and take it forward for implementation. The programme will be operationalized through partnerships between LSGIs, academic/research institutions, Government Agencies, private enterprises and experts.
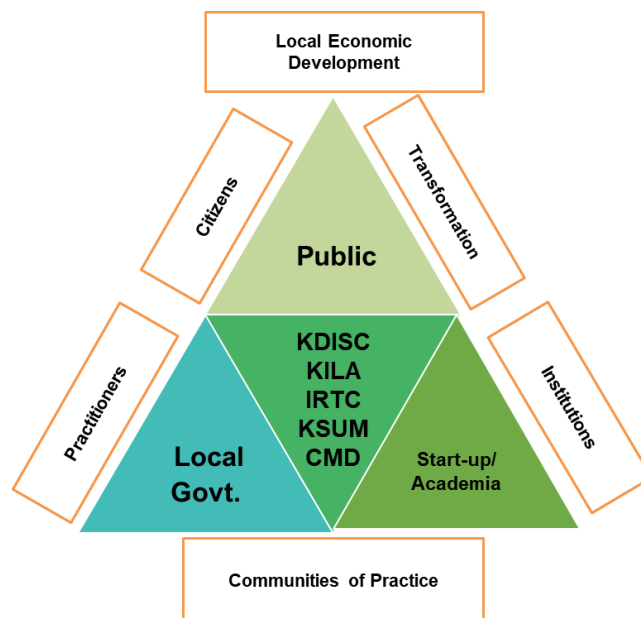
3) **Methodology of Implementation**

OLOI has two different paths to achieve its goals of integrating innovation at the local level:

i) a focused bottom-up aggregation of problems that are faced by the public in local governments by facilitating a platform for local government representatives to create a list of problems that they are encountering and require innovative solutions and

ii) a bottom-up mechanism of local idea generation by ideators and to create a nurturing system for these ideas towards innovative systems, products, or novel local and social enterprises.
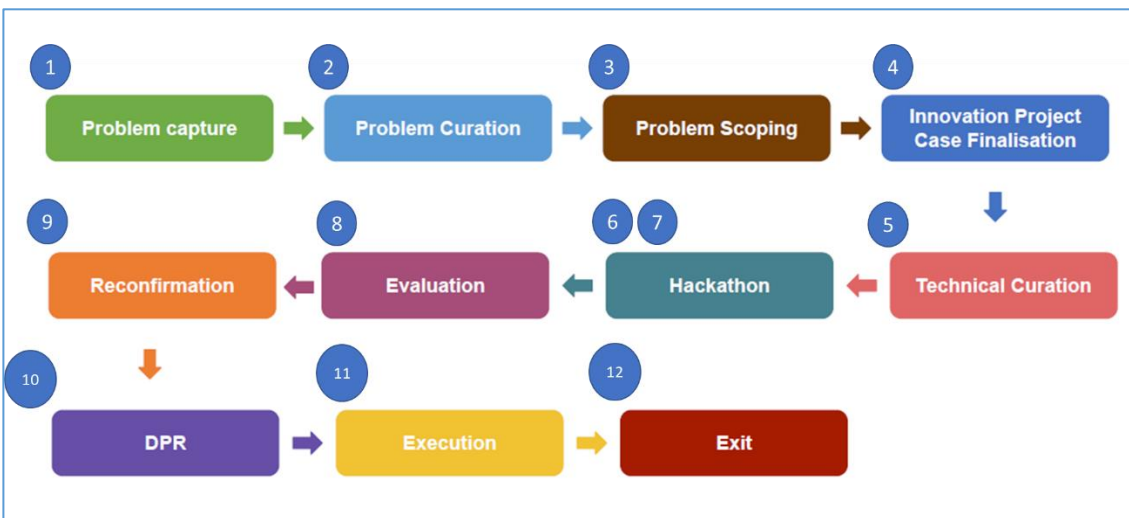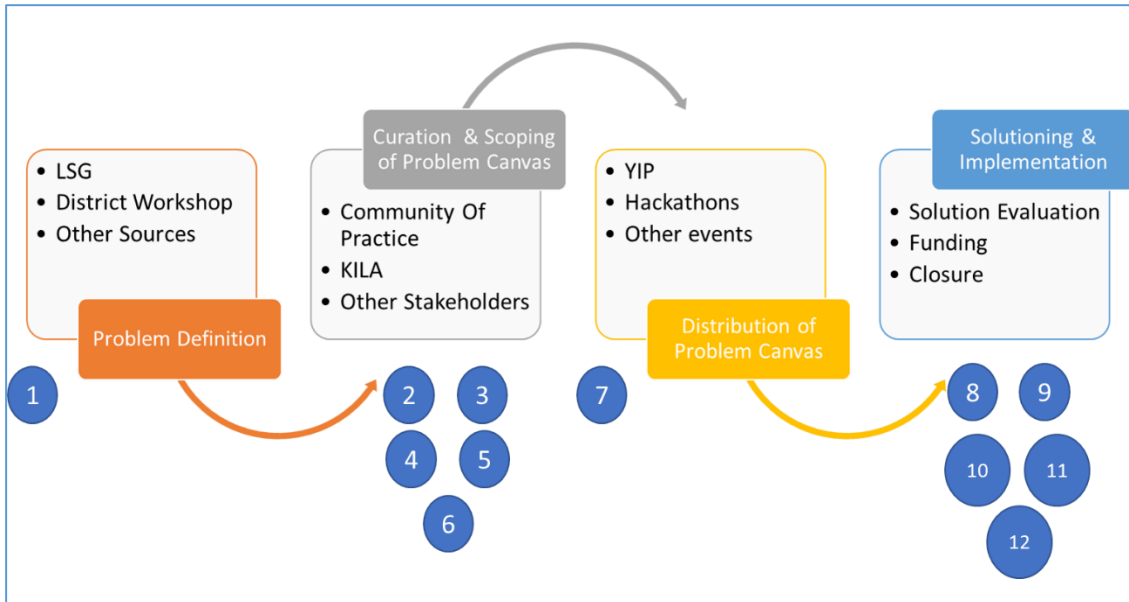
Community of Practices (CoPs) consisting of practitioners and experts who come together to share their knowledge and experience will examine the problem statements uploaded by the LSGIs and work towards arriving at innovative solutions for them. The CoPs are attached to domain institutions, who will work together with the CoP for the curation of problems and identification of possible solutions in a hub and spoke model.

4) Achievements in the period

The formal launch of OLOI will be held on February 19, 2023, as part of the Panchayat Day celebrations being organised by the Local Self Government Department, Government of Kerala.

Creation of support structure

1. A National Consultative Group (NCG) and a Bottom Up Consultative Group (BCG) comprising national and state experts have been constituted to provide direction to the OLOI project.

2. District Innovation Councils have been formed with District Panchayat Presidents as Chairpersons to facilitate the innovation ecosystem at district and sub-district levels.

3. K-DISC has developed an online platform for the submission of developmental issues by the Local Self Government Institutions.

4. K-DISC has constituted the Community of Practice (CoP) consisting of more than 1500 experts across 27 themes; their training and onboarding in the online platform set in place for facilitating discussions is under progress.

5. The services of the following institutions have been ensured to assist the local self-government bodies in the implementation of the project

   - Kerala Institute of Local Administration (KILA)
   - Kerala Startup Mission (KSUM)
   - Integrated Rural Technology Centre (IRTC)
   - Centre for Management Development (CMD)

Training and Workshops

6. As OLOI Programme is fundamentally a story of diverse stakeholders coming together to radically transform a local public service to better meet the needs of the locale and attempt to contribute toward the resolution of a wicked problem, K-DISC along with KILA has devised and implemented training programs at different levels and with different stakeholders.

Category Trained	Number
LSGI heads	1757
District-level implementing officers	495
Resource Persons	1449
Elected representatives	7760
Block-level implementing officers	1632
Grama Panchayath level implementing officers	7662

7. A handbook has been prepared and distributed locally among all stakeholders.

8. Volunteers are being recruited for problem curation and idea generation at the local level and a training/handbook is being prepared for them.

Rolled out pilot phase

9. A pre-registration link was created on the 'Sulekha' online portal for the selection of 100 LSGIs for the pilot phase of OLOI. The selection of 100 LSGIs from the list of local institutions in the state for the rollout of the pilot phase of the OLOI programme of KDISC will be done on a first cum first serve basis. This means that the LSGIs that express interest in participating in the programme need to submit the required information to the portal created for registration. For this, KDISC, with the support of IKM, created a registration link on the existing portal (Sulekha).

Establishing Institutional Hubs for Innovation

1) Introduction

The Programme for establishing institutional hubs for innovation is central to the innovation promotion programmes of K-DISC. K-DISC is handling three programmes for innovation promotion.

1. Promoting Emerging Technology Solutions in Government
2. Young Innovation Programmes
3. District Innovation Council

In Promoting Emerging Technology Solutions in Government the methodology adopted is to identify problems faced by department where innovative solutions can be applied, look for start-ups who have actual working experience in related areas and handhold them continuously liaising with the departments, improving upon the solutions proactively with the department during the PoC or pilot stage and if found successful attempt a scale up. Here we end up with a few champions in Government as well as a group of start-ups who are potentially capable of fostering innovation on a larger scale.

In the Young Innovation Programme (YIP), K-DISC works through academic and research institutions in the state through idea challenges on specific themes of interest in Kerala's Development. Groups of ideators from academic institutions and research institutions who are interested in working for three years on out of the box solutions on problems relating to the YIP themes participating in the challenge and are shortlisted through a rigorous three stage process for mentoring. A group of research, academic and social enterprises have been identified to partner with Kerala Start-up Mission and K-DISC for mentoring the talents identified in YIP. Here we end up with a group of young talents ready with products ready for start-ups or social enterprises or problems which require further intense research investigation.

The District Innovation Council programme aims at creating district level network of young innovators, mentors and institutions interested in becoming part of the Kerala Innovation Ecosystem.

2) Objectives

- To establish 5-10 institutional hubs for innovation through an Institutional Challenge Programme.
- To establish 5 District Innovational Hubs through a Challenge program, open to District Panchayats and Corporations.
- To develop a model for Kerala Innovation Fund.
- To establish an innovation fellowship

3) Methodology of Implementation

Institution Hub Challenge

The Institutional Hub Challenge is a program open to institutions of higher education social enterprises and state research institutions interested in working in a hub and spoke model for promoting innovation in the state. The programmeis open to institutions who are ready to

(i) Register with K-DISC for participating in the challenge.

(ii) Willingness in establishing a Community of Practice (CoP) jointly with K-DISC with participation of professionals or academics who are part of the institution jointly with external experts, costs of which shall be borne by K-DISC.

(iii) Willingness to establish a shelf of problems to be thrown open to innovators under the guidance of professionals who are part of the institution jointly with external experts, costs of which shall be borne by K-DISC.

(iv) Come up with a Logical Framework Analysis (LFA) linked action plan for a coordinated effort for a period of one year to attempt focused translation of selected academic or research outputs into products for the market or social enterprises in a theme relevant to Kerala development, which could be funded by K-DISC through a flexible funding programme.

Community of Practice Programme

The Community of Practice (CoP) is a concept popular in Knowledge Management, developed at Cambridge and Harvard, extensively used by corporates and developmental agencies. The concept was mooted by cognitive anthropologist Jeane Lave and educational theorist Etienne Wenger. They together mooted the theory of situated cognition- a theory that posits that knowing is inseparable from doing, arguing that all knowledge is situated in activity bound to social cultural and physical contexts.

District Hubs of Innovation

District hubs of Innovation shall be a challenge open to District Panchayats and Corporations for establishing a public space at the district headquarters for innovators to tinker with innovative ideas or challenging problems. This tinkering space will follow the pattern of Deconstruct, Reconstruct and Repurpose (Tod-Fod-Jod) pattern used by the National Innovation Council to build a pool of creators and not just consumers of products. A common tool room and working spaces need to be developed.

Kerala Innovation Fund

The Kerala Innovation fund would strive to develop the model for a crowd sourcing platform and internet based market place linking practitioners, policy makers, bureaucrats technocrats, policy and the common man to engage with and air their pain areas and problem statements and to arrive at innovative solutions through a virtual forum with ideators, researchers, technologists, practitioners, educational institutions, consultants, accelerators, incubators and startups and undertake Proof of Concepts (POCs), develop prototypes and attempt scaling of pilots if needed.

The Innovation Fellowship

The success of the flagship programme of K-DISC, YIP, could fundamentally reshape the way Kerala's growth and development model had evolved over years. YIP could help Kerala leapfrog to a knowledge economy and could provide the foundation by creating a pool of innovation champions, who have acquired the skill through an experiential pedagogical approach, in solving problems in a people centric manner. The army of innovation champions graduating through YIP program could solve the twin problem of 'wealth creation' and 'job creation'.

The project was not pursued during the current year due to resource shortage.

Multi Stakeholder Programme

1) **Introduction**

As Kerala moves ahead into a self-sufficient, technology driven food production platform, Multi Stake Holder Platform (MSP) is one of the essential tools and component that would also allow the farmer for higher specialisation and resultant income from the homesteads, while ensuring Safe to Eat Food for the household too.

The traceability of Agriculture food supply chain management is important to ensure the food safety. It also increases the customer satisfaction and peer-to-peer productivity. The centralised data storage makes it more difficult to assure quality, rate, and origin of the products. So, we need a decentralised system where transparency is available which makes people from the producers to consumer's satisfaction. Blockchain technology, which is a digital technology that allows us to acquire traceability and transparency in the supply chain.

Making use of this technology improves the community between different stakeholders and farmers. The blockchain may essentially provide increased capacity, better security, immutability, minting, faster settlement, and full traceability of stored transactions records. While the government should implement a full traceability system, the system should encourage the private producers and distributors to establish their own traceability system. The entire system should be fully integrated with the Local Self Governments and decentralised governance.

Payment and Settlement systems driven by technology should ensure daily settlement and payment to the bank accounts of farmers/beneficiaries. The same day payment will act as an incentive for demand led production.

Predictive analytics models may also be developed for production – supply matching. Using these systems, we should be able to predict the market demand for gradually moving into demand led production including production for export purpose.

2) **Objective**
- Increase farmer's income by creating block chain enabled market linkages
- Traceability of Agriculture food supply chain management
- Making use of technology improves the community between different stakeholders and farmers

3) **Methodology of Implementation**
- A web based on mobile based technology solution with capability to integrate block chain capabilities

4) Achievements in the period

- Conducted workshop with 17 cooperatives in Ernakulam with the presence of minister for Industries for expansion of the platform and aggregating and marketing of produce from these cooperatives
- 350+ Regular Customers
- INR 20,000 worth of Weekly transactions
- The project was presented before the World Bank as part of their Resilient Kerala Initiative on 14 December 2022.
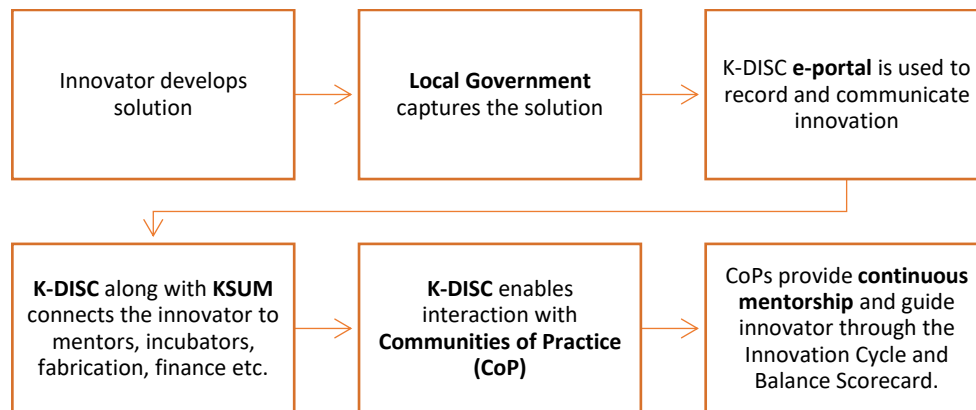
Local Innovation Programme

1) Introduction

Local innovation refers to innovations by society members outside the framework of schools, colleges, and formal industries. The journey of Kerala into a Knowledge Society must make opportunities to identify innovators from all walks of life and provide the right support to nurture them for value creation. K-DISC will ensure the right ecosystem for identification and scaling of Local Innovation for risk mitigation, scaling, expert connect, and sustainable value creation.

2) Objectives

To equip people from all walks of life for real life problem solving.

3) Methodology of Implementation

Innovator develops solution	**Local Government** captures the solution	K-DISC **e-portal** is used to record and communicate innovation
K-DISC along with **KSUM** connects the innovator to mentors, incubators, fabrication, finance etc.	**K-DISC** enables interaction with **Communities of Practice (CoP)**	CoPs provide **continuous mentorship** and guide innovator through the Innovation Cycle and Balance Scorecard.

- The process for promotion of Local Innovation will follow Innovation Lifecycle and will leverage the Triple Helix+ model to integrate components of academia, industry, government, community, and environment.
- A portal and a yearlong system will be established.
- The Local Government is best placed to identify local innovators and innovations and guide them into the right track for scaling and value creation. K-DISC and KSUM the ecosystem mechanism to leverage the Triple Helix + Model and the CoP provides continuous mentorship to take the innovator through the Innovation Cycle and create value using the Balance Scorecard. District level CoPs will guide innovators to build competencies, take their idea to prototypes, converting prototypes to working models and scaling working models to sustainable sources of value generation. Those innovations requiring more advanced levels of expertise are guided by State Level CoPs.

A campaign is initiated through local governments to mobilise innovators whose innovations would be funded based on recommendations of expert committee.

Local Innovation Ideas / Projects promoted by K-DISC so far

Sl. no.	Title	Innovator / Agency	Particulars
1	Large Scale Production of Microbial Consortium for Municipal Solid Waste Management Management	Integrated Rural Technology Centre (IRTC)	Microbial consortium, combination of bacteria and fungi capable of aerobic degradation of biodegradable solid waste into compost. The compost is highly useful as organic manure. K-DISC is helping IRTC in scaling of the microbial inoculants and development from the lab scale to commercial so that they would make it available to local government institutions for using composting devices.
2	Medical devices for iatrogenic urethral damage prevention, assisted bladder emptying and intraoperative autologous blood retransfusion	Digital University Kerala	The proposal aims to develop 1. a device to prevent urethral injuries associated with catheterization. 2. a device for assisted urine voiding in patients with bladder dysfunction. 3. a low-cost device to enable easy and safe intraoperative autologous retransfusion of blood for locations without easy access to blood banks.
3	Amphibious project	Smt. Nanma Gireesh	Aims to research, design, develop and learn by implementing an amphibious house in a flood-prone area in Kerala Support from K-DISC: An amount of Rs. 85,000 was released as financial support for the pilot implementation to the innovator.
Projects moved to EV and Green Energy Projects			
4	High Pressure Bio-CNG Generation for Sustainable Transportation	TReST Park	The project aims to convert locally available biodegradable waste to Bio-CNG*, which has higher calorific value and high usability, compared to biogas and make it available at high pressure. The fabrication of High Pressure Bio-gas generation and conversion to Bio-CNG will

Sl. no.	Title	Innovator / Agency	Particulars
			be the output. The bio-CNG so available can be pressurised further and bottled and made available for transportation purpose as well. *CNG – Compressed Natural Gas
5	Bioethanol project	CSIR - NIIST	To assess the Feasibility of Bioethanol Production from Water Hyacinth Biomass (WHB)
Projects with limited progress in 2022-23			
6	Rigas Engine	Rajeesh Rajan	First local innovation of K-DISC awarded patent for his design of two stroke elliptical IC rotary engine having better volumetric efficiency than Wankel Engine. K-DISC had proposed Computational Fluid Dynamics (CFD) for its design and released grant for this. Automaker Mazda had shown interest in the product and Defence Research and Development Organisation (DRDO) had reviewed this earlier. The engine has potential applications in aircrafts, drones, electric vehicles because of higher power to weight ratio and low vibration.
7	Moving Bridge Electricity Generator	Rejimon Leela Dennis	Utilizing the human energy exerted on the ground in public locations to be converted into electricity. A moving bridge electricity unit to be piloted at Veli Tourist Village.
Dropped Project			
8	Smart Air Quality Monitoring System	Shri Biju Oommen	The air monitoring system will sense several air quality parameters that include temperature, relative humidity, air pressure, CO_2, TVOC, PM2.5/10, CO, NO_2, O_3 and HCHO and provide this data geo tagged and time stamped to the cloud servers. Data collected at the cloud servers can be made available to the device owners (on their mobile),

Sl. no.	Title	Innovator / Agency	Particulars
			regulatory bodies, government or other

New innovations will continue to be selected at the local level and promoted under the programme.

4) Achievements in the period

1. **Medical devices for latrogenic urethral damage prevention, assisted bladder emptying and intraoperative autologous blood retransfusion**
   - The proposal is forwarded by Digital University Kerala and aims to develop
     1. a device to prevent urethral injuries associated with catheterization.
     2. a device for assisted urine voiding in patients with bladder dysfunction.
     3. a low-cost device to enable easy and safe intraoperative autologous retransfusion of blood for locations without easy access to blood banks.
   - Some of the required consumables and equipment have been purchased. The remaining purchases are in progress.
   - A Senior Research Scientist has been positioned for the project from 01-11-22.
   - A visit was made to CMC Vellore and held discussions with medical experts on the autotransfusion device.
   - Detailed literature survey for both the autotransfusion device and the CAUI device have been completed.
   - The exact requirements for the autotransfusion device have been studied and determined. Detailed requirement specifications have been prepared. Work on the device for assisted urine voiding is yet to start.

2. **Large Scale Production of Microbial Consortium for Municipal Solid Waste Management**
   - Microbial consortium, combination of bacteria and fungi capable of aerobic degradation of biodegradable solid waste into compost. The compost is highly useful as organic manure.
   - K-DISC is helping IRTC in scaling of the microbial inoculants and development from the lab scale to commercial so that they would make it available to local government institutions for using composting devices.
   - Coir pith based microbial inoculum was checked for its composting ability on mixed bio-waste and poultry waste. Experiments were initiated with composting studies in biocomposter bins; they were eventually extended to heaps and ended up in larger windrows.
   - Laboratory investigations were made in aerobic bins with a mixture of vegetable trimmings (non-marketable green vegetables and partially spoiled fruits from grocery stores) and poultry waste. Aerobic method makes possible the accumulation of sufficient heat from bacterial metabolism to

raise the temperature of the mass to the thermophilic range. In this range, the biological breakdown of organic matter is most rapid.

- During the composting process, gradual changes in the texture of the raw materials were notable during decomposition. Temperature curves remained appreciably above ambient temperature during initial days. Thereafter a rapid rise in temperature was paralleled by a corresponding decrease in total size and odour, until finally a normal decline in temperature marked the completion of the process. It was found that the course of temperature in the compost bin was indicative of the progress of the process from its beginning to its completion.

- Decomposition progressed with great rapidity and within 9 days reached the stage of maturation. The temperature change in a composting bin is closely correlated to the microbial activities and is normally considered to be one of the main parameters used to monitor the composting efficiency.

- Comparatively better composting was evidenced in heaps and windrow composting with absence of foul smell and leachate. Procurement steps for the instruments were initiated. The items were listed and advertisement for popular dailies were prepared and published. Tender advertisement floated. Quotations were scrutinized. Instruments were purchased successfully; installed and standardized.

- Meanwhile, construction of the laboratory – cum – working area for mass production of microbial consortia progressed smoothly. Foundation, flooring and related higher level construction works were completed within the stipulated time as proposed.

As per the proposed plan, an average of 100 L of concentrated microbial consortium was prepared daily. Freshly produced bulk inoculum was mixed evenly with appropriate levels of coir pith, under aseptic conditions. Microbial consortium mixed coir pith was packed in sterile bags, weighed, and sealed. Distribution of the same as powder as well as in briquettes form has been initiated, enabling the successful accomplishment of the rollout program.

3. **The Amphibious Project**
   - The project by M/s NestAbide aims to research, design, develop and learn by implementing an amphibious house in a flood-prone area in Kerala.
   - The NestAbide team visited nine panchayats, identified potential beneficiaries, conducted site investigations, and examined soil, water, and geological conditions. They presented a pre-final design of a 500 sq.ft amphibious house, excluding the buoyant foundation.
   - The core team, along with their construction workers, visited both sites in Kollam and Alappuzha in October to assess the construction prerequisites

and identify native stakeholders in the construction sector. They learned about local material availability and transportation from the mainland.

- Based on the modified data, the team is currently designing amphibious tiny houses of 600 sq.ft, including the buoyant foundation, to address workability and cost constraints.
- Efforts were taken to formally onboard Prof. Dr Ir. Chris Zevenbergen, Professor, TU Delft & UNESCO IHE Delft, as an expert member of the project.

Innovation Technologies
Accelerating Adoption of Emerging Technology Solutions in Government

1) Introduction

One of the stated objectives of K-DISC is to encourage/facilitate the adoption of Emerging Technology Solutions (ETS) in Government and public agencies to enhance efficiency and effectiveness of office systems and processes. In this sphere of development, K- DISC is promoting and initiating new projects in Emerging Technologies such as Blockchain, Internet of Things, Machine Learning, Artificial Intelligence, Robotics, that would soon enable transparent and cognitive advances in various departments of the State Government and deliver ultimate benefits to the citizens.

K-DISC would facilitate with different government departments that may need any of these technological advances to solve their critical problems and to arrive at the proof of concepts stage with adequate technical and financial resources to promote innovation. K-DISC will also ease the implementation by overseeing the same.

2) Objectives

1. Create an environment to facilitate innovation in Emerging Technologies for various Departments.
2. Partner with Innovation initiatives of the Departments and architect solutions for pilot implementations.
3. Provide technical and financial resources to promote the innovation.
4. Promote innovations around Emerging Technologies, through various initiatives in Government.
5. Handhold the pilot implementations till completion and provide necessary advice and support to both the Department and the Technology partners.
6. Assist Departments in eliciting and articulating problem statements and conduct gap analysis.
7. Involve in Benefit analysis and liaise with Domain Experts, Technical/Industry Experts and Organizations.
8. Provide technical and domain expertise to scale up implementations in Innovative Emerging Technology solutions.

3) Methodology

K-DISC follows a well-defined, transparent project management approach. Key stages in the Emerging Technology project life cycle are as follows:

1. Project Ideation
2. Freezing Project Proposal
3. Project Proposal approval by department
4. Technology Partner (Startup) Identification
5. Financial Approval & Registration
6. Project implementation

:Key stages in ET project lifecycle

After the successful pilot implementations, the projects are scaled up for the entire State of Kerala or the Phase 2 of the pilot is initiated, with advanced benefits for the End User Department and Citizens. K-DISC takes up all such projects with promising application of Emerging Technology in improving service delivery in government departments only with the complete support of the related department. K-DISC will provide the necessary financial and technical support to implement the Proof of Concept and mentor the start-up based on an in-principal approval from the Department. Once the Proof of Concept is found successful and beneficial the project will be handed over to the Department for scaling up and implementation.

4) Achievements

The achievement are categorized as:

Sl No	Section	Page No
1	Emerging Technology Projects (Original Track)	37
2	Citizen Service – One Department One Idea 2021 (CS-ODOI 2021)	47
3	Innovation for Government (I4g) 2021	52
4	eHealth Hackathon	55

Emerging Technology Projects (Original Track)

The year 2022-23 saw an increase in the overall number of projects handled in Emerging Technology stream, from 15 projects in the year 2021-22 to 33 projects in the year 2022-23.
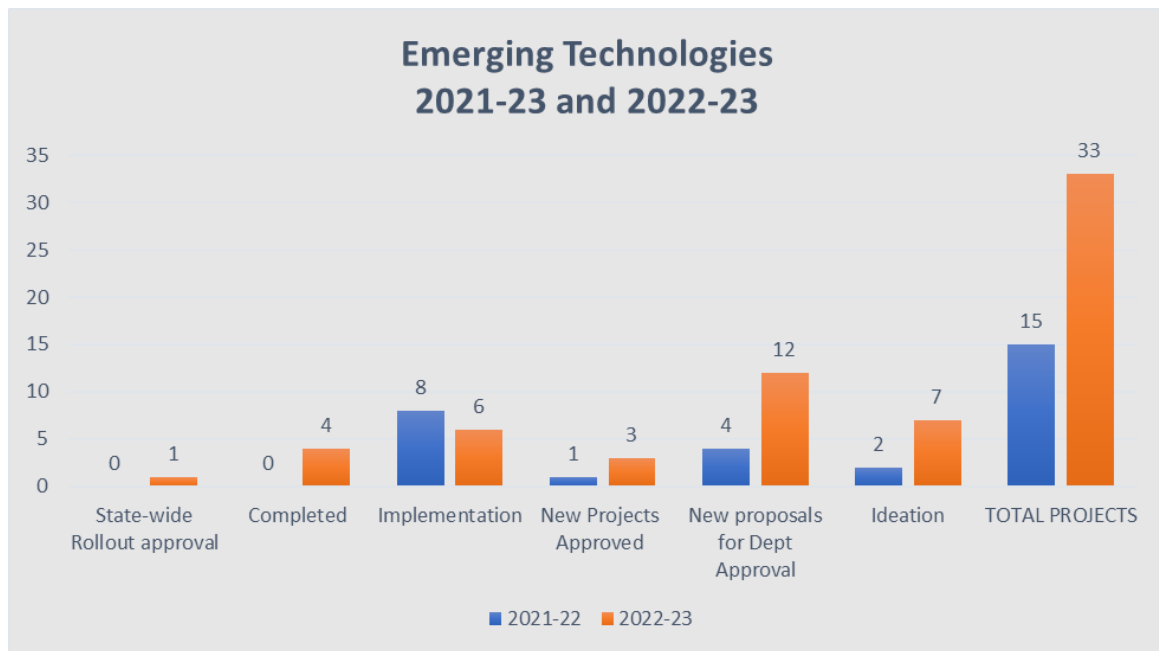
Government has approved implementation of Phase 2 of the project Blood Bag Traceability vide G.O.(Rt)No.51/2023/H&FWD Dated 08-01-2023, in 41 Blood collection centres and 57 Blood storage centres throughout Kerala. K-DISC has been requested by Kerala State Aids Control Society (KSACS)to support them in implementing the project and handhold the project till successful delivery.

Successfully Completed Emerging Technology Projects 2022-23

The following projects have been completed successfully by K-DISC during 2022-23 and the benefits are detailed below:

SI No.	COMPLETED EMERGING TECHNOLOGY PROJECTS		
	Project Name	**Department**	**Completion**
1	Antibiogram Application	Health Department	November 2022
2	Artificial Intelligence Based Facial Recognition on Real-Time Live Video Surveillance	Kerala Police (Law &Order)	September 2022
3	PII secure Storage using Blockchain	Health Department	September 2022
4	Consumer Billing Application for Drinking Water Supply – K Meter APP, K Self APP & Web Application for KWA	Kerala Water Authority	November 2022

Antibiogram Application

A conversational antibiogram chatbot application, amenable to be personalized to individual doctor's specialization, provides the following:

- Ready access and reference to Anti-Microbial Resistance resources published by Government of Kerala, focused information on pathogens and antibiotics in their field from open-source databases and recommended antibiotic treatments protocols.
- Collaboration tools like chats, notes, alerts/notifications, etc.
- Knowledge sharing tools Blogs, posting of case studies etc.
- Gamifying treatment protocols through self-tests and practicing by treating virtual patients.

The pilot has been launched at the Medical College Hospital, Thiruvananthapuram to selected end users and will be expanded to all doctors, across Kerala.

Artificial Intelligence Based Facial Recognition on Real-Time Live Video Surveillance

Thisis a pilot project implemented for the Police Department to identify people from surveillance footage and mug shots, usually in absconding and man missing cases. It aims:

- To implement a platform to carryout AI based Facial Recognition on live video feeds from surveillance systems.
- To match face recognized from live video feeds with photos of wanted criminals, known criminals and missing persons and notify the concerned law enforcement officer within seconds.

Two HD IP cameras installed at Prepaid taxi counter, Thiruvananthapuram Central Railway Station – Power House Road Exit to carry out AI-based Facial Recognition on live video feeds from CCTV surveillance systems.

Installed Network Video Recorder (NVR) with storage for Video Back Up coordinated with the Nodal officer at Police Control Room, Cantonment Police Station, Thiruvananthapuram.

Completed one-month pilot with the AI-based Face Recognition server (Web server and Mobile application), uploaded and trained with photos of K-DISC employees and Police officers in Pattom Traffic police station for the below cases.

1. Recognize faces without mask.
2. Recognize faces with mask.

K-DISC presented the observations and suggestions from the one-month pilot implementation to the then Deputy Commissioner of Police (Law & Order, Traffic) on 20th September 2022.K-DISC also submitted the references of previous

implementations by the technology partner to the Deputy Commissioner of Police (Law & Order, Traffic).

The Deputy Commissioner of Police (Law & Order, Traffic) approved to initiate one more month of piloting the system along with the Department officials of the Commissioner's office and agreed to provide a decision on scalability after discussion with the Commissioner of Police, Thiruvananthapuram.

Personal Identifiable Information (PII) secure Storage using Blockchain

The Blockchain enabled "PII secure Storage" system permits seamless integration through APIs with the Electronic Health Record System of eHealth.

The objectives of the project are:

- To segregate Personally Identifiable Information (PII - Aadhaar Number) from the existing eHealth database and store them on a tamper proof and secure Blockchain.
- Permit existing eHealth application to function unchanged on this blockchain secured PII.
- Store Aadhaar number in PII Secure Storage.Initially, this will be on a local server, but finally it will be located in the State Data Center.
- Develop a Test Console to test the Blockchain based PII Secure Storage. The test console stores the DB with UHID/Member ID and Transaction Hash.
- Develop the API and give to eHealth Team, to integrate with eHealth Application.

The project was verified by eHealth in two modules and verified for its successfully completion.

Consumer Billing Application for Drinking Water Supply

This project aims at reforming the services rendered to Kerala Water Authority (KWA) consumers and digitizing the bill generation process. As part of this project, K-DISC has developed two new mobile applications named "K Meter" and "K Self" and a Web application for KWA.

The **K Meter** mobile application enables the KWA meter readers to generate bills for the consumers in the routes assigned to them. This application facilitates the prompt generation of water bills and makes spot billing a reality for KWA consumers. The QR code embedded bills are sent as SMS to the consumers, enabling them to make the payments through UPI.

The **K Self** mobileapplication allows consumers to take the meter readings at regular intervals and make instant online bill payments at their own convenience. This is a digital platform that makes consumers manage KWA bills without

depending on the meter readers. If they miss, the meter readers can still send the bill as SMS to the consumers.

These mobile applications require capturing the photograph of the water meters. The GPS data is captured automatically, while generating the bills, serving as a fool-proof system for generating bills. SMS with the bill details will be sent to their registered mobile number and a QR code is also available to make UPI payments.

The **Web Application for KWA** section officers provide extensive analytics, dynamic reports, and a detailed overview of the business and helps to gauge the performance of the routes and improve the efficacy by acting according to the analytics, aligning with the strategies and goals of KWA.

K-DISC conducted offline training of the meter readers in the Palayam and Pattoor section and convened an online training session for the master trainers of KWA prior to the piloting.

The pilot implementation of the **KMeter** Mobile App**, K Self** Mobile App **& Web Application for KWA** in the locations Palayam, Pattoor, Thripunithura and Thodupuzha sections during September 2022 to November 2022, was done in a phased manner.

The following benefits have been achieved during piloting:
- Enabled Real time billing and payments for consumers.
- The Meter Readers were able to perform timely bill generation using their own mobile applications.
- The Consumers received the Bill information as SMS and were able to make the bill payment through UPI applications, via a QR code and the Quick pay links in the bill.
- Consumers performed bill generation and payment at their own convenience from home using the K Self App without the dependency on the Meter Reader.
- The associated web portal for the KWA officials provide control, visibility and analytics for the entire Bill Generation and Payment information.

Following the successful completion of piloting, KWA officially rolled out the applications across the State on 21st December 2022.

Since then, more than fifty thousand bills were generated using the K Meter APP. Currently, the mobile applications are available for download in Google Play Store. The Phase 2 of the system is being defined by K-DISC, along with KWA, including advanced Innovative features for the benefit of citizens and the Department.

Pilot Project Implementations in progress

Sl No	Project Name	Department
1	Emerging Technology-driven continuous Drinking Water Supply System for Pandalam Municipality (Kerala Water Authority).	Kerala Water Authority
2	Cervical Cancer Screening	Health Department
3	Artificial Intelligence based system for automatic screening of Diabetic Retinopathy Phase 2	Health Department
4	AR/VR based training	Kerala Police Academy
5	Smart Crop Insurance using Blockchain Technology	Agriculture Department
6	Tissue Culture Traceability	Agriculture Department
7	Citizen Climate Connect	Thrissur and Palakkad District
8	Remote Monitoring System for Solar Plants	ANERT

*Emerging Technology-driven continuous Drinking Water Supply System for Pandalam Municipality (**Kerala Water Authority**).*

Emerging Technology-driven Continuous Drinking Water Supply Monitoring System for Pandalam Municipality Town is the scaled-up pilot implementation of the Tank Level Monitoring System implemented at Athiramala for Pandalam Water Supply System, covering all three zones of Pandalam Municipality. The aim of this project is to improve the water management system in Pandalam town by monitoring the water levels, flow rate, and line pressure of water pipelines. This will help to detect any issues with the water supply system and take appropriate action to rectify them. Additionally, by monitoring the energy footprints of water pumps, the project aims to reduce energy consumption and save costs.

The level sensors, flow meters, pressure sensors and energy meters will be installed at the pilot locations. These sensors will collect data on the water levels, flow rate, line pressure, and energy consumption, and transmit this data to the central server via IoT gateways. Software application that can be used to visualize and analyze the data, making it easy to monitor the water management system in real-time. This will enable the town's water management team to take proactive measures to ensure a stable and reliable water supply for the citizens of Pandalam, reducing revenue loss and improving customer satisfaction.

The project kickoff meeting was held on July 13th 2022, and brought together all key stakeholders, including project managers, engineers, and vendors. After the kickoff meeting, the procurement process for the necessary devices began. The devices were received and underwent thorough testing to ensure they met the project specifications and requirements. On January 24th2023, the installation process for the devices began by installing a flow transmitter at Athiramala. This included setting up the device in their designated location, connecting it to the necessary networks and systems, and performing necessary configurations. The installation process was closely monitored to ensure that it was completed on time and within budget.

Cervical Cancer Screeningfor Health Department
Automated Cervical Cancer Screening is a pilot project undertaken forthe Department of the Health and Family Welfare to create an AI based system for the automatic diagnosis of cervical cancer using Liquid Based Cytology(LBC) technique. It aims to streamline the work of pathologists and help them handle more cases in a much easier way. The project will develop a software that can successfully detect the different types of cells, conditions and abnormalities in each scanned image of a Cervical Pap Smear sample.

Achievements:
- Procured LBC(Liquid based Cytology) equipment.
- Collected 915 LBC slides from patients and entered 499 patient details into the portal.
- Developed a web portal to enter the patient information, image annotation and report generation.

*Artificial Intelligence based system for automatic screening of Diabetic Retinopathy Phase 2 for **Health Department**.*
'Artificial Intelligence based system for automatic screening of Diabetic Retinopathy Phase 2' is a pilot project undertaken for Health and Family welfare department to reduce the vision loss due to Diabetic Retinopathy by early detection and treatment.

The objectives of the project are:
- Real-time Retinal image quality assessment by online Picture Archiving and Communication System (PACS) Integration with software
- Automated recommendation for Diabetic Retinopathy (DR) by Retinal image analysis
- Operator notification of gradeability and/or analysis results by SMS/Email
- Automate the preparation and sharing of patient screening reports using smart work flow.

- Integration of the DR Analysis with Patient EMR

Achievements:

- C-DAC developed the AI server and web Application for Intelligent DR scan [IDRS] which can also support the image gradeability analysis.
- Software Requirements Specification approved by Health Department
- Integration completed with the Mobile Application for Image capture.
- Trial run initiated in Kadakampilly FHC.

*AR/VR based training for **Kerala Police Academy***

Augmented Reality/Virtual Reality-based Training and Crime Scene Forensic and Investigation simulation" undertaken for Kerala Police Academy. The project envisages to build situational awareness and information, increasing the responsiveness of the on-ground enforcement personnel and to provide distributed and immersive training for law enforcement officers which can be deployed in-precinct within any 10x10 ft. area.

The objectives of this project are to:

- Develop a configurable 3D enabled immersive Virtual Reality training platform in compliance with the general requirements.
- To educate and train law enforcement personnel to become well-prepared police personnel, through a cost-effective training solution.
- Build situational awareness and information, increasing responsiveness of the on-ground enforcement personnel.

The configurator module developed by K-DISC is a powerful tool that allows users to configure and customize various aspects of crime scenes quickly and easily. The module has been designed to be highly user-friendly and intuitive, making it easy for users to navigate and make changes as needed.

On August 27th, 2022, K-DISC demonstrated the configurator module to KEPA, showcasing its capabilities and features. The demonstration included the integration of the module with 5 different crime scenes, allowing KEPA to see first-hand how the tool can be used to enhance crime scene investigation training and analysis and received technical inputs for further development and improve the configurator module to better serve the needs of the crime scene investigation.

The integration of the configurator with 5 different crime scenes has been successful, and the module has been accepted by KEPA for further implementation The configurator, which allows for customization of equipment settings, was updated based on feedback from the technical team. The updated version was then demonstrated to the Director of KEPA on January 20th, 2023. The Director was pleased with the integration of the configurator with 5 different crime scenes, and the module has been accepted for further implementation.

*Smart Crop Insurance using Blockchain Technology for **Agriculture Department***

'**Smart-Crop Insurance using Blockchain Technology'** is a pilot project implemented for the agriculture department to overcome the limitations of the current climate-based crop insurance policy. Chittur Block panchayath in Palakkad district is selected for the pilot study. Accordingly, seven Grama panchayats of Palakkad district have been made Reference Unit Areas (RUA) for effective study and implementation of existing weather-based crop insurance.

The objectives of this project are to:

- Making available relevant, accurate, real time and validated weather data for all the stake holders
- Ensuring settlement process more transparent and democratic
- Modelling a financial ecosystem to offer timely and proactive assistance to needy farmers.

To provide hyper-local weather data, 14 indigenous weather stations (IoT) had been installed as part of the project in the reference unit areas of Eruthenpathy, Kozhinjampara, Vadakarapathi, Nallepilly, Chittoor-Thathamangalam, Perumatty, and Pattanchery in the Palakkad district to gather weather data.

Web applications and Mobile apps have been developed to provide weather information transparently to farmers and the Agriculture Department.

K-DISC in coordination with Agriculture Department held a workshop for Farmers and Agricultural Officers to give an introduction to the mobile application and web portal developed as part of the project '**Smart-Crop Insurance using Blockchain Technology'** and to create awareness on its benefits and advantages for farmers and other stakeholders who are part of the weather-based crop insurance scheme at Chittur, on **5th January 2023.**

Tissue Culture Traceability for Agriculture Department

The project will deploy Blockchain enabled android and web application, along with QR code labelling to enable an end-to-end traceability for the whole tissue culture process. The project is being piloted at Biotechnology and Model Floriculture Centre (BMFC), an institute situated at Kazhakootam, under the Department of Agriculture Development and Farmer's Welfare.

Major Achievements
- Letter from Secretary for Approval of expert committee for protocol standardization received on 2nd May 2022
- Letter from Agriculture Director to K-DISC for Implementation approval received on 06th May 2022
- Draft MoU received and MoU to be signed with the Agriculture Department.

Citizen Climate Connect – Thrissur and Palakkad District

The Citizens' Climate Connect (Triple C) is an action-research project undertaken by K-DISC that integrates citizen knowledge, land-based monitoring systems, and the global climate models under one umbrella to provide support for local action and build local resilience. Citizens Climate Connect is an initiative that aims to ground truth global climate models to the local context by overlaying citizen knowledge and land-based monitoring systems. This will establish a continuous loop of localized data, data analysis, validation and aggregation, analysis, interpretation, downscaling, and provide support to local action. This will be tested in Thrissur and Palakkad by the District Administration under the technical support of K-DISC. The result will be disseminated in user-friendly formats for managing disasters and climate change.

Project Objective:
- To systematically document how citizens observe, predict, and measure the changes in climatic conditions and its impact.
- To scientifically analyze and validate the citizen knowledge and practice on climate adaptation and mitigation.
- Database and GIS maps capturing citizens' observations, indicators, and impacts using mobile applications.
- Network local private-public land-based observation systems to create real-time data sets.
- Developing Global climate/disaster models for early warning.
- To generate local contextualized decision support tools, EWS for better response and resilience

Major Achievements
- Proposal approved by Ms. Mrunmai Joshi IAS, Palakkad Collector on 20th October 2022
- Proposal approved by Ms. Haritha V Kumar IAS, Thrissur Collector on 11th November 2022

Remote Monitoring System for Solar Plants for ANERT

This pilot project will provide a scalable platform to monitor the information on power generation, consumption, and transfer to GRID from 27 identified locations by ANERT. This platform will be able to scale and support all the locations across Kerala in the future. For measuring the parameters from the Solar Generation meter, Inverter, and Power Export/Import Meter, Internet of Things (IoT)sensors will be installed at the 27 pilot locations. Initially a proof of concept will be conducted at 2 selected sites along with the identified technology partner.

TheProposal was approved by ANERT on 29th October 2022. Startup identification is completed and was presented to CEO, ANERT on 13th January 2023.

New pilot project proposals submitted to Department for Approval in 2022-23

Sl No	Project Name	Department
1	Land records – Revamped Approach	Registration Department
2	Landslide Early Warning System	Kerala State Disaster Management Authority (KSDMA)

*Land records – Revamped Approach for **Registration Department***

Land Records aimed to modernize the management of land records, minimize the scope of land/property disputes, enhance transparency in the land records maintenance system, and make the services people-centric and facilitate moving eventually towards guaranteed conclusive titles to immovable properties in the state.The revamped approach of the proposal will introduce an integrated and effective system on Blockchain for the better and prompt delivery of services to the citizen, by providing full control of the property to landowners through technology interventions. It will automate the process of issuing encumbrance certificate and E- Aadharam.

As per the Registration Department's permission Vanchiyoor Village in Thiruvananthapuram district is identified as the pilot area.

Landslide Early Warning System

The excessive loss of life and property experienced recently during 2018, 2019 and 2020 floods and landslides across the State of Kerala highlighted the need for an integrated approach for flooding and landslide management. The objective of this project is to develop a landslide early warning system (LEWS) in Pullurampara, Kozhikode District. In this project, a new approach of Global Navigation Satellite System (GNSS) Tomography technology was introduced for hyper-local weather forecasting.

CITIZEN SERVICE – ONE DEPARTMENT ONE IDEA 2021 (CS-ODOI 2021)

CS-ODOI, an initiative from K-DISC, is an exclusive platform for the employees of Government Departments and Agencies under the Government of Kerala, to submit Innovative Ideas for their departments. The objective of this program is to encourage the unreserved participation of all Government staff to improve the process or product innovations in the respective departments or any Government departments that they interact with.

Four projects have been approved to be taken for pilot implementation, from the CS-ODOI 2021 initiative.

Sl No	Project Name	Department
1	CS ODOI 2021 – Integrated Smart Parking at Gandhi Park	Thiruvananthapuram Corporation
2	CS ODOI 2021- Citizen Satisfaction Survey (Citz Happy)	State GST Department
3	CS ODOI 2021 - State Level Virtual Road Safety Training platform	Motor Vehicle Department
4	CS ODOI 2021- UnnathiJalakam	Scheduled Caste Development Department
Projects selected for Proof of Concept and/or under review		
1	CS ODOI 2021 - Administration and Management of Chit Funds in Kerala	Registration Department
2	CS ODOI 2021 - Sampark-Ensuring Interoperability	To be finalized
3	CS ODOI 2021 - Sensor Camera Based Adaptive Intelligent Traffic Signal Control System	MVD

CS ODOI 2021 – Integrated Smart Parking at Gandhi Park - Thiruvananthapuram Corporation

The Project aims to build an efficient parking management system by identifying the existing parking infrastructure. The objective is to notify and bring the available parking facility into a database that helps in minimizing parking-related problems by giving advance information to drivers/users. Smart Parking is a parking strategy that includes smart IoT (Internet of Things) devices in an effort to make parking vehicles much faster, simpler and less time-consuming in a crowded area.

The parking-related problems could be minimized if drivers had advance information about vacant parking spots. With specialised Automatic number-plate recognition (ANPR) Camera and IoT sensor systems for monitoring parking lot occupancy and reservations, the data can be collected easily. Based on historic

data in the system, day of the week, Calendar events etc are recorded and an AI algorithm can be launched to predict daily & hourly demands. Accordingly, a parking space seeker can decide to opt for booking ahead or book just in time. AI based analytics program can also help in "look ahead" prediction of space availability.

CS ODOI 2021- Citizen Satisfaction Survey (Citz Happy) – State GST Department
The project intends to achieve the following objectives:

- To develop an easy-to-use configurable platform for all Government departments to collect citizen feedback and to enhance public experience and happiness in accessing Government services.
- To develop a web portal to onboard Service Delivery Centers (SDC) for recording feedback on services delivered by the Government to the citizens.
- To develop a QR Code based process for measuring the quality of service delivered from SDCs.
- To develop a mechanism to help departments to collect, record and manage feedback and improve their service delivery.
- To use modern technology in improving public service delivery with features to configure, collect, record, Manage, and analyse feedback from citizens.

Key Benefits to citizens

- A facility to record their level of satisfaction with the service received from the Government
- Results in improvement in service delivery
- Simple steps to record feedback
- Facility to share suggestions for service delivery improvement
- Provides for active participation of citizens in governance.

Key Benefits to Government

- Configurable platform for creating customized feedback/ survey forms fordepartments
- Measure the quality-of-service delivery at any point in time.
- Easy identification of pain areas and initiating remedial measures for all deliverypoints at any point of time.
- Dashboard for Decision making and analysis.
- Facility to record positive feedback.
- Encourages transparent and healthy competition among different service deliveryunits.
- Ranking of offices/ Departments at the state level.

Major Achievement

Project has been approved by the Technical Committee chaired by the IT Secretary and administrative sanction has been issued to the technology partner to start the implementation.

CS ODOI 2021 -State Level Virtual Road Safety Training platform - Motor Vehicle Department

The proposed platform will enable Motor Vehicle Department (MVD) to conduct pre-license classes, learner's tests, and other training programs in an organized manner, accommodating the need for additional labor to finish paperwork and offer training. The platform will use augmented reality or virtual reality to provide a meaningful training experience and will also include features like video conferencing, online chat rooms, and automatic assessment of exams. The platform will promote efficiency by allowing stakeholders to share information and documents accessible to users anywhere. Users will also have access to different data shared by stakeholders regarding driving laws and license-related information, as well as links for registration and different classrooms for attending training programs.

The MVD in the State is facing challenges in providing training to a large number of candidates, as levels of understanding and engagement vary vastly based on the category they belong to. The training delivery system is not structured for the current service scale and does not support the incorporation of digital collaboration tools. Additionally, the MVD is incurring significant costs on infrastructure for training, as they do not have their own infrastructure in some places. There is a need for a unified digital platform for the MVD that brings all Driving License applicants together, provides proper road safety training and streamlines the procedures for numerous registration processes associated with the license. The platform may also be used to provide training for high school and college students as well as faculty about the current traffic rules and guidelines governing the motor vehicles department. Virtual training platforms can be implemented to better utilize resources and generate additional income for the government.

Major Achievements

1. In-principle approval for the proposal from Department on 1st December 2022
2. Startup selection initiated through KSUM

CS ODOI 2021- UnnathiJalakam- Scheduled Caste Development Department

The project "Unnathi – Jalakam" envisages addressing the problems and grievances of The Scheduled Castes and to improve the livelihoods through Science and Technological Intervention. It has been observed that the proposals are driven by the inquisitiveness of the implementing agencies/investigators rather than

taking into consideration the actual needs of the people, requirements in terms of innovative approaches, S&T components, and implementation mechanisms that enhance and create sustainable livelihoods for SC communities on a large scale with visible impact. The project is designed to address the current void in information dissemination about ongoing welfare schemes and programs of Government and ensuring timely assistance to needy at their doorstep. Tailor-made and customized programs which suit the real and felt needs of each individual and family will be made possible through Unnathi-Jalakam and the community can reach to Action Centre via a mobile app called ASK and their needs will be addressed with the help of Action Center and Door Delivery Service Providers. The Action Centres would be used to obtain feedback on the impact of existing schemes so that these can be finetuned and used while launching new schemes.

The SC community may have the inhibition to make queries regarding the welfare schemes for which they are eligible. It is envisaged to provide an intelligent Chatbot which can give precise information for queries raised.

Major Achievement

- Project proposal approval from Department on 16th January 2023
- Expression of Interest published for identifying start-ups on 23rd January 2023

CS-ODOI 2021 –Projects selected for POC

CS ODOI 2021 - Administration and Management of Chit Funds in Kerala – Project Proposal is under review by the stakeholders of the Registration Department

There is a need to enable the quasi-banking Chit industry and rebuild the trust in the system not just by digitizing the current process but also by leveraging next-generation technologies. The idea proposed is to address the gaps in the existing chit management system innovatively and redesign the workflows to make the administrative process fool-proof and futuristic.

The proposal aims to achieve the following objective - Administration and management of the chit business by implementing a state-of-the-art digital and automated chit workflow that helps create more visibility and transparency in the chit business using Blockchain.

A walk-through of the solution(T-Chits) of a start-up (ChitMonks) that has expertise in the same domain, registered in the Innovation for Government (i4G) 2021 initiative of K-DISC was provided to the Registration Department officials on 19th November 2022

CS ODOI 2021 - Sampark-Ensuring Interoperability

The Idea "Sampark - Ensuring Interoperability" submitted by Ms. Rejeetha Ramakrishnan (Deputy Director e-Governance and IT, Dairy Development Department is being considered for pilot implementation.

K-DISC is proposing to leverage Blockchain technology in Unified Registry to improve data security and redundancy and enhance transparency and streamline the process of sharingregistry data. It not only protects against future data security threats but also has several additional advantages as follows and serves as a repository that serves both citizens and Government Departments:

➢ Citizen will be the sole owner of data and the seeker Departments can verify citizen's data using the distributed ledger technology.

➢ Built-in redundancy

➢ To achieve transparency by intimating the citizen of any change in/access to his data, and enable the system for consensus-driven, trust-free intermediation.

➢ Effective, transparent "intermediation" between the departments and Aadhaar data vault

CS ODOI 2021 - Sensor Camera Based Adaptive Intelligent Traffic Signal Control System

The Idea "Sensor Camera Based Adaptive Intelligent Traffic Signal Control System" submitted by Mr. Dilip Kumar K G (Motor Vehicle Inspector, Motor Vehicle Department) is being considered for pilot implementation.

The objective of the project "Sensor Camera Based Adaptive Intelligent Traffic Signal Control System" is to implement an adaptive traffic signaling system at major busy intersections. The signal timing will be adjusted automatically according to the number of vehicles present in each queue. Minimal manual interventions are needed and this will help in the enhancement of traffic control.

Innovation for Government (i4G) 2021

It is a platform to attract start-ups from all over India, with expertise in Emerging Technologies. all over India, to showcase their solution to the most relevant buyers and users in the Government of Kerala. The shortlisted products/solutions under the health domain were presented by K-DISC to the Principal Secretary, Department of Health and Family Welfare. Based on this meeting's decision, the shortlisted start-ups had demonstrated their products/solutions to a panel of domain experts from the Department of Health and Family Welfare, nominated by the Principal Secretary, on 2nd and 8th April 2022. The following are the projects selected for pilot implementation after this demonstration:

Sl.No	Start-up Name	Product/Solutions	Department
1	Genrobotic Innovations Pvt ltd	G Gaiter -The Advanced Robotic Gait Rehabilitator	Department of Health and Family Welfare
2	Medtra Innovative Technologies Pvt Ltd.	Veineux AR 100	Department of Health and Family Welfare
3	Evelabs Technologies Private Limited	Dripo	Department of Health and Family Welfare
4	Heka Medicals India Pvt Ltd	HekaFlo	Department of Health and Family Welfare

G-GAITER – Robotic Gait Rehabilitator for DHS, Healthand Family Welfare Department

There are patients suffering from various paraplegic conditions who need emergency care and treatment. With the support of Robotic technology, we are aiming to make G-Gaiter feasible and accessible to all those who are suffering from paraplegic conditions through the implementation at Govt. Hospital, Thiruvananthapuram.

Key Benefits envisaged are as follows:
For Doctors/Therapists:
- Reduction of Therapy Time
- Active Gait Training Mode
- Exercising and Stretching Modes
- Smart Body Weight Balance
- Patient Effort Detection
- Different Range of Size Adaptability

For Patients:
- Motor Relearning
- AI-Powered Natural Gait Pattern
- Improves Posture

- Muscle Strength Improvement
- Improves Balancing
- Reduction in Spasticity
- Improves Motivation & Participation with VR Technology

Veineux – Vein Tracking device using Augmented Reality for **Health and Family Welfare Department**

Veineux is a vein tracking device using Augmented Reality, which will reduce failed attempts during different intravenous medical procedures. The portable, flexible, and hands-free imaging facilitate the difficult process of finding a vein in a much easier and faster way, without changing standard clinical terms and practices. The medical team can now accurately assess the real-time situation of peripheral veins before, during, and after piercing. Veineux not only improves the success rate of venipuncture in the first attempt itself but also the satisfaction and comfort of the patients, thereby creating a stress-free solution for the medical team.

Project aims to implement an Augmented reality-based no contact-based vein viewer, using harmless NIR rays, causing minimal pain and ill effects on the patients undergoing IV puncturing.
Project proposal has been approved by domain experts. The project proposal is submitted to department for next steps.

Following are included under the scope of the proposal.
- Delivery and Installation of 3 nos. of VEINEUX AR 100 to Government Medical College, Thrissur
- Train the nursing staff on correct use of the system
- Evaluate its usefulness to patients and nursing staff.

Dripo – Infusion Monitoring System for **Health Department**

Dripo is a simple portable connected infusion monitor that helps a health practitioner to set infusion rates accurately and monitor them from anywhere. It counts the drops and calculates real-time drop rates so that nurses can set the flow rate accurately. The device will send data to a central software installed at the nursing station, where rate changes and completion of every source will be alerted. Doctors can also view the patient history and treatment status from the server and can make decisions based on the data. Evelabs Private Limited is the technology partner, and Internet of Things (IoT) is the emerging technology component employed in this project and Malabar Cancer Centre, Thalassery is pilot location

The objective of the project is to implement 20 units of Dripo-smart infusion monitoring system (installed on a tab), improve accuracy in the delivery of intravenous (IV) medications and understand and visualize the errors associated

with intravenous (IV) fluid administration in hospital wards through electronic monitoring.

The Project proposal has been approved by domain experts. Project proposal submitted to department. Institutional Review Board (IRB) approved the project on 19th October 2022 and Institutional Ethics Committee (IEC) approved on 11th December 2022.

HekaFlo

The project is to Delivery and Installation of a single unit of Heka Flo -an IoT-enabled High Flow Nasal Oxygen Therapy Machine (HFNO/HFNC) along with all the accessories and software for the designated Government Institution (Hospital) for adult patients, Pediatric, Neonatal patients, etc. with respiratory distress. Mobile and web applications were included in Heka Flo product for remote monitoring of the patients

The product displays the patient's data from multiple devices. Age, current flow rate, temperature, FiO2, SpO2 pulse rate, Pulse Oximeter connection status will be displayed. Any user defined or system alerts generated from the device will be displayed as well

The project aims:

- To implement an affordable HFNC machine at the Designated Medical College for the treatment of hypoxic patients, with 100% humidified and heated oxygen at a flow rate of up to 60 liters per minute.
- To implement a mobile and web application for remote monitoring of the patients.
- To provide a support system for COVID 19 and post-Covid 19 infections and their complications
- To overcome the deficiencies of the imported HFNC machines like the wastage of oxygen.
- To monitor the SPO2 level of the patient with an integrated pulse oximeter.
- To improve the quality of life of a patient during hospitalization with this Non-Invasive ventilatory support device.

Achievements

- Demonstration of the product to the Principal Secretary, Department of Health and Family Welfare and domain experts.
- Demonstration of the product to the Directorate of Health Services (DHS) and Biomedical Engineers of National Health Mission (NHM).
- Concurrence to proceed with pilot. Formal approval is awaited.

eHealth Hackathon

eHealth, in collaboration with Kerala Development and Innovation Strategic Council (K-DISC) and Kerala Startup Mission had organized 'Hack 4 Health', a Hackathon event on November 22nd to 24th, 2021, soliciting start-ups to attempt 8 problem statements developed by the Health Department. A total of 68 start-ups participated in the hackathon. The following are the details of the start-ups and the problem statements attempted:

Sl No	Start-up Name	Problem Statement
1	Acutro Technologies	Facility mapping in hospitals for the public to track and use
2	Linsys Innovations Private Ltd.	Effortless patient prescription/investigation reports through voice text conversion
3	Qkopy Online Services Pvt Ltd.	Mobile app or platform to connect the beneficiaries of government health schemes
4	Waggle Lab	To design an AI based chat system for providing health related information through eHealth portal
5	EXPRESSbase Systems Pvt Ltd.	Single server data analytics dashboard with multiple forms for patient management
6	Lares.AI	To design a system for disease forecasting/Prediction
7	Bagmo Pvt Ltd.	To design a voice-assisted OP token management system along with AI based Queue management System. The same has to be disabled-friendly.
8	AiMed Solutions Private Limited	AI based Analysis of SNOMED- CT coded EMR

Four problem statements were taken on priority and multiple meetings as well as site visits were carried out and the finalized project proposals were submitted to Project Director, eHealth Kerala for formal approval.

eHealth Hackathon - Facility mapping in hospitals for the public to track and use

The objective of the project is to help patients and visitors with accurate directions to go to different facilities within the hospital. At present, it is planned to pilot the facility mapping system for 38 facilities by placing Bluetooth-enabled devices in the designated locations and developing mobile and web applications for the users to search and track the facilities. Acutro Technologies is the technology partner and, Internet of Things (IoT) is the emerging technology component employed in this project. The pilot institution is Government Medical College, Thrissur

Major Achievements

- Domain experts approved the project proposal on 26th November 2022
- Project proposal submitted to Project Director, eHealth Kerala on 7th December 2022
- In-principle approval received from Project Director, eHealth Kerala on 22nd December 2022
- Go ahead for the project from Project Director, eHealth Kerala received on 23rd January 2023

eHealth Hackathon - Effortless Patient Prescription /Investigation Reports Through Voice Text Conversion

The objective of the project is to develop a Speech recognition or speech-to-text functionality for Effortless electronic medicine/investigation prescription for doctors in crowded hospitals without keying in computers during a patient consultation. The project also aims to integrate Artificial intelligence with developing Speech Recognition functionality to efficiently recognize clinical terms pronounced by doctors. The developed functionality will integrate with eHealth platform. Linsys Innovations Pvt. Ltd. is the technology partner and Artificial intelligence is the emerging technology component used as part of this project.

Major Achievements

- Approval from eHealth on 12th December 2022
- Project proposal submitted to Project Director eHealth on 10th January 2023
- Go ahead for the project from Project Director, eHealth Kerala received on 23rd January 2023

eHealth Hackathon - Mobile app or platform to connect the beneficiaries of government health schemes

A mobile application to provide the public with basic information about the KASP-PMJAY schemes. Unregistered users will be provided basic information regarding scheme details and nearby empaneled hospitals and specialties available. After registration on the application, the beneficiary will be able to obtain information on eligibility, card status, card balance, nearest empaneled hospitals, specialties, and grievance redressal. A web portal is being developed for SHA admins to view beneficiary details such as beneficiaries' available balance and status of health cards, and to generate monthly reports for hospitals, District Program Coordinators (DPCs), hospitals, and administrators.

Major Achievements

- In Principle approval from Project Director, eHealth Kerala on 22nd December 2022
- Project proposal approval from State Health Agency (SHA)
- Initiated internal committee.

eHealth Hackathon - To design an AI based chat system for providing health related information through eHealth portal

A single access point for disseminating all information in the eHealth portal using a multilingual AI chatbot with voice communication capabilities. Following are the functionalities provided through AI chatbot.

- Online appointment booking for UHID registered users and new patient registration through API integration with eHealth system.
- To provide information of all government hospitals with available health facility information from eHealth portal through eHealth API.
- Provide general information given by Health Department on Cancer Screening, Communicable Diseases, Non-Communicable Disease &AmmayumKunjum displayed on appropriate selection.
- To provide first level online screening for cancer and non-communicable disease, based on Questionnaire given by Health Department.
- To provide screening status for patients tested at the FHCs using API integration with eHealth.

Major Achievements

- Project proposal submitted to Project Director, eHealth Kerala on 12nd January 2023
- Project Director, eHealth Kerala recommended to proceed with the next steps (internal committee) of the project.

The remaining problem statements are being defined into project proposals in coordination with Domain experts from the Department.

Social Enterprises and Inclusion

Innovation by Youth with Disability

1) Introduction

The project, Innovation by youth with Disabilities (I-YwD), identifies and empowers persons with disabilities who are self-motivated to formulate and implement innovations in society. I-YwD's goal is to nurture innovators from the marginalised community. For the participant innovators to achieve their goal, the I-YwD project provide resources in the form of training and mentoring for a period of two years or till their ideas have materialized and stabilized, whichever happens earlier. The idea could take the shape of a product, a service, applied research or a combination. In order to actualize the idea, the program offers knowledge, tools, perspective and motivation to the participants.

2) Objectives

1. To identity youth with disabilities with a drive to be innovators/ entrepreneurs/ researchers
2. To catalyse their role as innovators and change-makers.
3. To offer training, mentoring and skill development with accessibility features.
4. To create a pool of sensitised stakeholders who are able to empathise and adapt based on need.

3) Methodology

The program is in partnership with National Institute for Speech and Hearing (NISH)

- Selection of participants
- Preparation of highly engaging and participatory, hands-on curriculum for the blended learning program
- Pre-camps and trial camps to identify possible errors which running the final camp and make necessary modifications to minimise problems in Initiation Camp, the Idea Springboard' Camp and the Booster Camp
- Up-skilling of the core team to ensure that all team members had a clear understanding of the content to be covered at the camp and the most appropriate pedagogy to transact the knowledge.
- Development of Blended Learning Program which increased accessibility as well as possibilities to get the contents of the program across to a larger number of individuals. It combined face-to-face and online learning experiences and a combination of video and audio content, Learning Management System based learning engagements, synchronous interactions and in-person experiential learning.

- Individualized mentoring for the participants who have developed the idea into a solution to set up their innovative ventures

4) Achievements so far

1. Launched in the year 2019, I-YwD matured into a thriving program through its pilot execution with the first batch of 19 participants which included persons with deafness, blindness, orthopedic challenges and persons with Autism.
2. Two participants have joined hands on a project together to develop an assistive device to aid the rehabilitation of persons with upper limb paresis/paralysis after an attack of stroke. The product is being prototyped by KDISC to make it available in the market.
3. In the wake of COVID 19 pandemic, I-YwD decided to go virtual in 2021. The I-YwD Blended Learning program, which is a combination of Learning Management System (LMS) based learning engagements, synchronous interactions and in-person experiential learning was launched in November 2021 with its second batch of 21 participants. This blended learning program involves development of videos of various chapters in Sign Language as well.
4. 40 YwDs are identified and given continuous mentoring (online and face to face) on making and realizing an innovative idea.

Talent Search for youth with Disability (YwDs)

1) Introduction

This program attempts for a talent search among Youth with Disability and in guiding them to nurture their talents and equip them to take leadership roles in their life.

2) Objectives

- To identity youth with disabilities with a potential talent
- To develop Individual Talent Support Plan (ITSP) for each of the participants
- To further enhance their talent through training, mentoring and skill development
- To boost their confidence in utilising their skills and talents
- To create a pool of highly talented Youth with Disabilities and connect them with various employers

3) Methodology of Implementation

In partnership with Kerala Social Security Mission (KSSM) and Institute for Communicative and Cognitive Neuro Sciences (ICCONS)

- Organizing a 3-day leadership camp for the selected candidates.
- Each participant's ability and potential for development, as well as identify their strength and weaknesses during the Camp by Catalysts and Resources
- Conducting Socio-Economic study by home visits,
- Preparing an Individual Talent Support Plan (ITSP) for each participant based on the above information's collected. The information in the ITSP is to be validated and confirmed by contacting each participant.
- Three-year periodic training and mentoring to develop the skill as per the ITSP

4) Achievements so far

1. Launched in the year 2019, Talent Search matured into a thriving program through its pilot execution with the first batch of 46 participants

2. Individual Talent Support Plan(ITSP) for the 46 participants have been created by assessing their talent and socio economic backgrounds

3. Due to the Covid pandemic situation, the proposed three- year offline sessions did not materialise, instead, online training sessions for Music, Dance, Videography, Drawing and Mimicry and mentoring were given to 46 participants for the past two years

4. Perception Assessment to determine the effectiveness of the training to the participants has been organized, Overall, all participants responded that they were able to improve their talent through training.

5. A second batch of 75 YwDS were selected to initiate the next cycle.

6. 41 YwDs attended a three-day performance assessment camp and all selected for the three-year training program

Miyawaki Afforestation Project for Rapid Forest Development and Climate Change Mitigation

1) Introduction

A novel method for rapid afforestation in urban areas, based on an effective model first developed and implemented by Prof. Akira Miyawaki of Yokohama, Japan. Through this Project, K-DISC aims to protect and promote Kerala's terrestrial ecosystems through Rapid Forest Development, and help the state mitigate the adverse climate changes that our high population density and unscientific, rapid urbanization have caused. The project also aims to scientifically analyse the Environmental Impact of the Miyawaki model in Kerala.

2) Aims and Objectives

1. To help people mitigate the climate change impacts by adapting on scientifically validated, innovative forest cultivation techniques.
2. To help prevent and make up for the depletion of medicinal plant resources through cultivation of them in a species dense forest ecosystem rather than under monoculture gardening.
3. To help prevent the ecological disaster faced by coastal population due to ravages of climate change including water shortage, erasing of dwellings along the seashore, deprivation of natural biologic resources in the coastal belt and the prevalent unemployment among youth and women in the costal tract of Kerala.
4. To help development projects achieve full success by bringing line departments, local bodies, and the communities together to work on emerging problems of ecological imbalances arising due to traditional compartmentalized and fragmented problem-solving approach by development agencies
5. To partake in the national mission on Climate Change Action Plan with India's Nationally Determined Contributions (UNFCCC)

3) Methodology

The original method of Miyawaki is adopted and adapted to meet the objectives of the project with changes such as inclusion of endemic species of plants for highest rate of survival and attraction to insects, birds, and other living organisms. The project ultimately enables combined working of various disciplines and various departments as well as non-governmental organizations to achieve development of improved biodiversity and reduce carbon footprints in Kerala for healthy living in this climate era.

The process of developing Forests on the Pilot Land is described in brief below: -

- Preparation of Pilot Land for Rapid Afforestation

- Planting & Growing Saplings in nearby Nursery
- Transportation of Saplings from Nursery to Pilot Land
- Planting of Saplings
- Post-Planting Mulching
- Watering & Regular Maintenance

During the first year, maintenance is required for 6 months as the whole planting process will take 6 months. During the second and third years, plants need support for 12 months each. No further care is required thereafter. Consequently, dense forest of 100-150 years of growth can be achieved in just twenty to twenty-five years.

Environment Quality Monitoring: Miyawaki model of afforestation has almost been successfully completed at the designated locations in different districts of Kerala. The prominence of the project is to improve the environment quality. The visible change in the said parameter can be currently obtained, but in order to analyze the environment impact in a quantitative manner the suggestion is to conduct analytical study at all the destinations.

Methodology: The environment impact is studied using latest technology and equipment. The samples are collected from all Miyawaki project sites, and from a control plot within 1 km radius having almost the same bio-physical characteristics. The samples thus collected are analysed with various parameters by a NABL accredited laboratory. The impact of Miyawaki forest patches can be arrived by analyzing the test results showing the needed parameters.

Parameters: Analysis of soil quality, air quality, ground water recharge capability, and noise absorption are the main parameters that are to be studied. The impact of noise has to be measured separately as other equipment installed at the site will be producing a constant low audible noise during operation, so that the entire sample collection process requires two independent visits to each location. Each visit will extend to duration of 24 hours at each site.

4) Achievements so far
1. The project is piloted at 12 plots across Kerala which covers a total area of 1.5 acres (150 Cents)
2. Around 25000 saplings were planted in area of 1.5 acres and within a span of 2 years, 85 percentage of the plant have gained enough growth to make the 1.5 acers of land into a dense forest, which act as a green lung for the urban spaces in Kerala.
3. The list of the indigenous plants planted in the identified plots has been screened by the technical committee constituted by KDISC with eminent persons working in reputed R&D institutes and Universities.

4. The diversity of indigenous plants and their rapid growth has helped the land to convert to a forest ecosystem and it promoted the flourishing of the flora and fauna of the place

5. Citizens across Kerala are sensitized about the importance of Afforestation owing to the number of calls received at KDISC office.

6. A lot of Miyawaki Afforestation attempts including the private Miyawaki afforestation endeavours took place in Kerala

7. On-going Environment Impact Assessment is on-going in the 12 plots.

Table 1: Details of the Miyawaki Forests plots

Sl. No	Location	Area
1	Government High School, Chalai Trivandrum	10 cents
2	INS, Venduruthy, Cochin, Ernakulam	10 cents
3	Muziris Munakkal Beach, Azhicode,Thrissur	20 cents
4	CUSAT, Ernakulam	10 cents
5	Ashramam Maithanam , Kollam	20 cents
6	Muziris Alapuzha Port Museum, Alappuzha	20 cents
7	Bekal Resort Development Corporation, Bekal, Kasargod	10 cents
8	Institutional Complex under Women and Child Development Department, Thrissur	10 cents
9	Between Community hall& Park (Port Authority), Batt Road, Kozhikode	10 cents
10	Ponnani, Malappuram	10 cents
11	State Forest Training Institute, Walayar Palakkad	10 cents
12	Aadalloorkavu Temple, Kannur	10 cents

Knowledge Mission

Kerala Knowledge Economy Mission (KKEM) Comprehensive Program for Employment of Educated Unemployed In Kerala

1) Introduction

The World Economic Forum in its journal- Future of Jobs Report 2020 reported that approximately 85 million jobs are giving way to approximately 97 million new types of jobs. It is in this scenario that the Kerala Government has embarked on an audacious programme named 'Kerala Knowledge Economy Mission (KKEM)' under Kerala Development and Innovation Strategic Council (K-DISC), with a vision to develop Kerala into a Knowledge Society and thereby achieve economic growth and lifestyle improvements for its citizens.Knowledge economy focuses substantially on knowledge creation to address current and future problems of society, creates new avenues of sustainable development and foster an all-round intellectual growth of people, at best using digital technologies as an enabler.

2) Objectives

- The objective of Kerala Knowledge Economy Mission (KKEM) is to transform the state of Kerala into a Knowledge society, which will produce, consume and transact knowledge for its own social and economic advancements.
- KKEM focuses on the specific target of achieving employment for 20 lakh people through local demand creation and employment facilitation at local and international levels by 2026.
- The key principle of KKEM Architecture is to build and nurture an ecosystem of Job Seekers, Mobilization partners, Skills partners, Industry partners and Benefits providers.
- KKEM also envisages establishing a social security system and infrastructure support system for the Knowledge Workers.
- The KKEM program also provides for provision of necessary infrastructure to engage in remote work for those who have temporarily quit their jobs and those who have returned from foreign countries.
- The Digital Workforce Management System (DWMS) targets to become the 'World Largest Talent Marketplace'. The following are the components under the DWMS overview:

Job Seekers side	Skill Development side	Job Providers side
● Freshers ● Educated Unemployed ● Career Break Women ● Returning Expatriates ● Collectives	● Skill Providers ● Educational Institutions ● MSMEs ● Grooming Agencies ● Counseling& Curation Services	● Employers ● Aggregators ● Gig Work Provider

3) Methodology

- As part of the initiative, a Digital Workforce Management System (DWMS) has been developed by the Digital University of Kerala which acts as a facility for registering Knowledge Workers having different competency profiles. As part of the second phase of development, a mobile application of the DWMS named 'DWMS Connect' has been developed.

- ICT Academy of Kerala has undertaken the task of creating job opportunities in the knowledge economy mission related to demand aggregation management.

- DWMS platform serves as a platform of platforms and the integration with major job aggregators such as LinkedIn, Awign, Foundit, Tseek and Freelancer are in various stages.

- Also initiative has been taken to connect the major skill providers of the state like ASAP Kerala, ICT Academy, KASE and Employment Exchange providing job opportunities to this platform.

- As part of the counselling and curation, necessary steps are being taken to utilize mechanisms like Employability Centers of Employment Exchange, Ward Level Workers of Kudumbashree, Career Facilitator Interns and Personality Development Professionals.

- The DWMS platform also incorporates a robotic interviewing procedure to help employers learn more about the applicants.

- Steps are taken to connect agencies like Kudumbashree, iTrack, University Departments, IHRD, CDAC, NIELIT and Women Development Corporation to the DWMS platform for skill development and grooming. An agreement has been signed with the Confederation of Indian Industry to bring in 7 lakh jobs.

- A campaign driven strategy for a social and behaviour change is envisioned to change candidate preference from Government jobs to private sector knowledge jobs. For achieving the targets, systems for flexible freelancer jobs in project mode will be developed and talent pools will be created for such assignments.

- KKEM has developed a four-pronged strategy for the Programme for employment to 20 Lakh Educated Unemployed:
  1. Mobilising the unemployed educated and career break professionals for registration, training, and engagement on the digital portal for prospective employment
  2. Establishing a system for career counseling and hand holding them through individually through the skilling and assessment programmes
  3. Engaging the trained job seekers with job providers and facilitating prospective engagement.
  4. Establishing a social security system and infrastructure support system for the Knowledge Workers engaging with job providers for working near home.
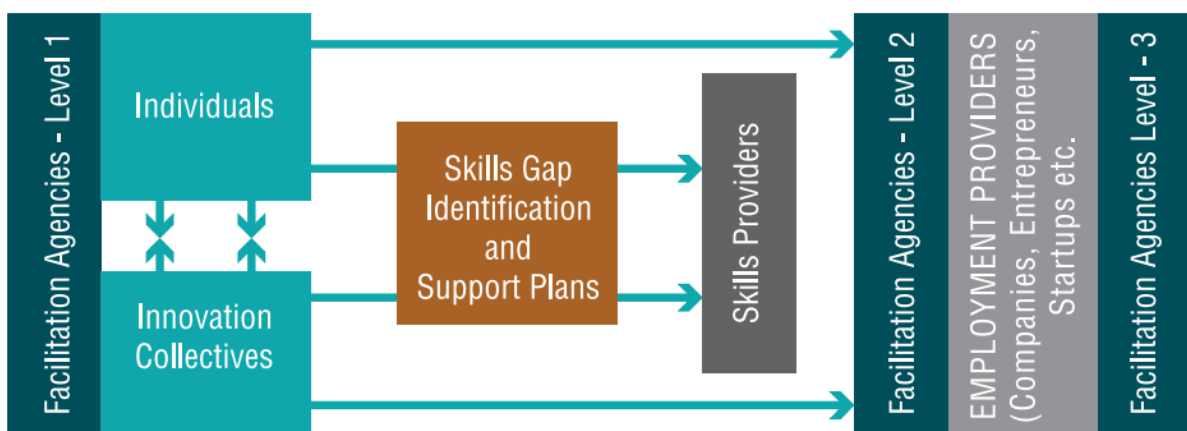

Figure 8.1 KKEM Architecture

The implementation of the activities under the Kerala Knowledge Economy Mission mainly concentrate on the following key areas,

1. **Mobilization**- KKEM tries to create a social behavior change among the job seekers towards the private sector jobs and motivate them to utilize the job opportunities in the private sector through its mobilization activities and the mobilization campaign also focus to create awareness about Kerala Knowledge Economy Mission among the educated job seekers and people of Kerala in general. 'Thozilsabhas' are being conducted at the grass root level for the better reach of the programme.

2. **Curation and Counseling**- KKEM provides value added curation and counseling services to the job seekers and through multiple interventions such as general awareness programme, employability development programme and remote workforce development programme and specific interventions on need basis that will prepare the job seeker with the work environment expectations.

3. **Skilling & Skill Infrastructure**- Training Service Providers and Skill Partners is getting engaged in a distributed model, whereby they could associate with KKEM and its strategic partners such as KASE, ASAP, ICT Academy to train candidates coming through Digital Workforce Management System (DWMS).

4. **Demand Aggregation**- a comprehensive demand aggregation programme through collaborating with industry bodies, job and work platforms, and through direct engagements with recruiters and job providers, is a critical part of the strategy.

4) Achievements

The achievements are categorised as:

Overall Outcomes

Parameter	Numbers (as on 30-01-2023)
Total candidates registered on DWMS	12,99,866
Total employers registered	3,521
Total vacancies created	4,10,365
Total vacancies currently available	30,351
Total Applications received	5,73,703
Total Applicants interviewed	31,761
Total Applicants shortlisted	21,796
Total Applicants hired	11,377
Applicants hired through ASAP	1,199
Applicants hired through Kudumbashree	4,799
Applicants hired through KASE	4,443
Applicants hired through Employment Exchange	9,860
Applicants hired through NORKA	566
Total Hired along with partner organisations	32,235

Achievements in DWMS

The main features included in DWMS V2.0 Web Version and in DWMS Connect Mobile App are listed below:

I. Over 12 lakh Job Seekers registered on DWMS – Around 70% Experienced profiles and 30% Fresher profiles. 95% are active profiles.

II. Provision for Job Seeker registration with Basic Job Seeker information, Education, Experience and Job preference details that will enable DWMS system to suggest the best suitable job vacancies and recommended skill courses for bridging any gaps in the competency level of the Job Seeker.

III. AI based enhanced Job Matching Algorithm used in DWMS V 2.0 recommends the most relevant job openings for the Job Seeker based on the education, skill set, experience, and job preferences.

IV. Integration with Zappyhire, I-Track, Lifology and British Council is completed and Integration with Orisys, Foundit (Monster), Awign and LinkedIn is in progress.

V. Report Builder and Integrated dashboard are developed to enable the KKEM management in data analytics enabling them in strategic decision making.

VI. Push Notification from DWMS Connect Mobile app helps to broadcast the information to Job Seekers regarding new matching jobs vacancies and new skill courses suitable for each job seeker.

VII. Incorporated tools to support the CCC campaign from ASAP/ITD.

VIII. The Employer module in DWMS helps in Employer Onboarding and Employer verification. Once verified and onboarding is completed, employer will be able to publish their Job Requirements and search for matching candidates based on education, skill set and experience and level and get the details of matching job seekers to proceed further with the recruitment process.

Achievements in Mobilisation

The KKEM Mobilization Target is to mobilize 18 lakh job seekers to Digital Workforce Management System (DWMS) by March 2023 (16 Lakh Job seekers through Public campaign, 2 Lakh Job Seekers from higher education Institutions, 1.5 lakh candidates from Colleges and 50000 candidates from ITIs). Currently we have 12,92,600 registrations in DWMS. As part of the mobilization activities two separate campaigns are being conducted:

1. My Job My Pride Campaign - Community focused campaign to identify job seekers and support them to register in DWMS.

2. Connect Career to Campus - Campaign focused on students who are currently in the Higher Education Institutions.

"My Job My Pride" Campaign

I. The State Inauguration of the "My Job My Pride" Campaign was held on 8th May 2022 at Chengannur Engineering College, Alappuzha. Hon. Minister for

LSGD Shri.M.V.Govindan Master Inaugurated the event and Hon. Minister for Fisheries, Youth Affairs and Culture Shri.Saji Cherian presided over the function. Both Ministers commenced the survey by visiting a nearby house and collecting the survey details. The campaign was conducted with the support of Kudumbashree Mission and identified 53 lakh job seekers (8th May 2022 to 23 June 2022).

II. In continuation to the survey it was decided to enroll the job seekers in the age group of 21 to 40 to DWMS initially, with the support of Kudumbasree Mission. Community Ambassadors were identified to spearhead this activity. District Trainings were provided to Community Ambassadors to do the profiling activity. They will support job seekers and enroll them into DWMS and encourage them to avail KKEM services and guide them towards suitable jobs. 1070 Community Ambassadors are positioned in 941 LSGIs.

III. To accelerate the grass root level mobilization, Community Ambassadors will participate in Thozhilsabhas organized by the Local Self Government Department and address the knowledge job seekers who attend the Thozhilsabhas. The state level inauguration of Thozhilsabha was held on September 20, 2022 at Pinarayi, Kannur. Hon. Chief Minister of Kerala Shri.PinarayiVijayan inaugurated the event. KKEM handled the Knowledge Group jobseekers who participated in the event and a career clinic session was also conducted.

IV. Dedicated Programme Management Unit of Kudumbashree for KKEM activities was established from December 2022. The PMU consists of 1 State Programme Manager, 3 Assistant State Programme Managers, 14 District Programme Managers and 1 Support Staff. From January 2023 Community Ambassadors will start working as part of the KKEM Kudumbashree Programme Management Unit on honorarium and incentive basis.

Connect Campus to Career (CCC)

Association with the Higher Education Department

I. The CCC Campaign was inaugurated by Shri. PinarayiVijayan, Hon. Chief Minister of Kerala on 2nd August 2022 in the presence of Dr R Bindu, Hon. Minister for Higher Education and Social Justice, Shri. M. V. Govindan Master, Hon. Minister for LSGD, Rural Development and Excise, Shri. M. Sivankutty, Hon. Minister for Labour and General Education, Shri. KadakampallySurendran, Dr K M Abraham, Chief Principal Secretary to the Chief Minister & Executive Vice Chairman, K-DISC MLA, Smt. Ishita Roy IAS, Principal Secretary, Higher Education DepartmenT, Smt. V Vigneshwari IAS, Director of Collegiate Education. During this event Hon CM released the KKEM LOGO. The Work Readiness Programmes, DWMS Connect Mobile App,

Skill Programmes, Career Support Executive Programme, Internship portal were also launched at the function. To augment the skills and placement arena in the state, Memorandum of Understanding (MoUs) were exchanged with leading firms like Monster.com, Confederation of Indian Industries (CII), LinkedIn, British Council, Tseek, Awign, World Malayali Council, and Entegrity.

II.   ASAP Kerala is the implementation partner for the CCC Campaign and mobilization activities in the Higher Education Institutions. The CCC Campaign activities are ongoing in the institutions, regular meetings were conducted to review the progress of CCC activities by the Hon. Higher Education Minister and Dr K.M. Abraham. It was decided in a review meeting to include the "Earn While You Learn" programme in the CCC campaign. This programme will help the students to work along with their studies and earn. Currently we have 637 institutions and 59434 Students registered in DWMS as part of the campaign.

III. A total of 332 institutions and 29,658 candidates have registered on the DWMS portal as part of the ITI institutions' Connect Career to Campus campaign.

Thozhilsabha

Thozhilsabha a stage organized by Local Self Government Institution with the task of supporting job seekers in a particular locality to gather information about job and skill enhancements opportunities. State level Inauguration of Thozilsabha was done by Hon. Chief Minister of Kerala Shri. PinarayiVijayan at Pinaryi, Kannur on 20/09/2022.

Thozhilsabhas are organized by LSGD and KKEM is allotted with a session in Thozhilsabhas in which potential knowledge about various opportunities for job seekers are addressed by Community Ambassadors and about the various services offered by KKEM.

KKEM appointed one Community Ambassador and one facilitator for each Thozhilsabha. These resource persons are trained and groomed by KKEM in various levels:-

1. A state level training was conducted by KKEM in Thiruvananthapuram for Kudumbasree DPMs and Master RPs

2. District Level training conducted for Community Ambassadors and field facilitators from September 1 to September 2022.

Around 13000 Thozilsabhas have been conducted till date throughout Kerala.

Thozhilorukkam

Thozhilorukkam is a preparatory process for Thozhilsabha, where Community Ambassadors will gather job seekers and complete their registration process and

make them aware about the Thozhil Sabha process. We have conducted online district level training for community ambassadors for 'Thozhilorukkam'.

Special Projects for Marginalized communities

Fisheries Department

A meeting with the Hon Minister for Fisheries was convened on 28.11.2022. For submitting a proposal depicting a special employment program by KKEM exclusively for the Fisher folk community. Officials from the department were present to discuss the plan and agreed to submit a detailed project proposal for further discussion.

SC, ST, OBC Department

A meeting with the Hon Minister for SC, ST and OBC was convened on 29/11/2022. With department officials to discuss the possible association with KKEM for creating employment for the community. A detailed discussion was held. Minister suggested submitting a detailed plan depicting the possible association and outcome with KKEM and the Dept. In light of the discussion, it was decided to formulate individual proposals for SC, ST and OBC categories.

Social Justice Department

The Gender and Labour division convened two meetings regarding Transgender community and PWD category. The first meeting was for transgender project which was held on 1/12/2022. KKEM plans to roll out two programs exclusively for the transgender and PWD category respectively. The proposals were submitted to the Hon Minister in the meeting.

Transgender Project

A second level meeting convened with Department officials on 29.12.2022 for finalizing the terms and budgeting. It was decided to prepare a detailed project proposal and submit it to the director.

PWD Project

A state level ideation workshop was convened for project implementation presided over by the Hon Minister for Social Justice on 23/12/2022 at Ernakulam. Representatives from various organizations under the PWD community attended the workshop and shared their suggestions and ideas. Based on the suggestions, a project proposal was prepared and submitted.

Gender in Labour- Ideation workshop

An ideation workshop for the conceptualization of the way forward of Gender related activities of KKEM. The workshop was attended by subject experts,

Government Officials, NGO and community representatives across the state. Based on the ideas and suggestions proposed in the workshop, a detailed project proposal was prepared and submitted.

LSGI Model Project Preparation Workshop for Women
A workshop on Model Project Preparation for LSGIs for women community was conducted with the help of KILA in Thrissur KILA campus on 13/12/2022. Various subject experts from different fields attended the workshop. They presented their ideas, model projects and implemented project reports in the workshop. The workshop assigned two experts to prepare 10 ready to use model projects in detail to be submitted to the LSG department.

District level meeting for LSGI Heads
A meeting for all the LSGI heads in every district was conducted as part of the campaign regarding 'Thozhilarangathekku' to create awareness and seek support from all the LSG institutions. This meeting was organized by the district panchayath and KKEM presented all the details regarding the project 'Thozhilarangathekku'.

<u>Thozilarangthekku</u>
'Thozhilarangathekku' is a project by KKEM, intended to provide jobs to the educated unemployed women of Kerala. The need for such a project can be understood from the survey conducted by Kudumbhasree and KKEM, where the results show that there are 53 lakh unemployed with plus 2 education qualifications under the age of 59 years of which 58% are women. Furthermore, from the results, it can be inferred that there are 5 lakh women who wish to gain employment. Since the majority of job seekers are women a project solely for the support of women was required which resulted in the formation of 'Thozhilarangathekku'.
Series of ideation meetings were held by KKEM with Kudumbasree State Mission, and thereafter training was provided to District Programme Managers (DPMs), Community Ambassadors to get accustomed with the concept of Thozilarangthekku.

State Level Placement Officers Training
State Level Training of Placement Officers from various Higher Education Institutions were held on 11 January 2023 at Jimmy George International Stadium. The meeting was inaugurated by the Hon. Minister for Higher Education Dr R Bindu, Smt. Vighneswari IAS, Director of Collegiate Education, presided over the inaugural function. Through this training Placement Officers were apprised about the campaign activities of Thozhilarangathekku and informed about the process and timelines to final year students and alumni of their respective colleges. The

training was attended by Placement Officers from across Kerala and several Government officials, media persons, organization / institution heads also attended the meeting.

Achievements in Curation and Counselling

There are 11.7 lakhs job seekers registered in DWMS till December 2022. The process of Curation and Counselling is designed in such a way that the job seeker will reach the job matching in any stages as per the job seekers preference.Kerala Knowledge Economy Mission support the job seekers with various career support services that builds confidence and grooms the job seekers presentable to the employers. The career support services like robotic interview and English Score have been considered as the shortlisting criteria for job placement through DWMS. The employers evaluate the job seeker performance based on the scores received in the services as criteria for their selection process.

Total Curated Job seekers: 43793

Sl No	Curation Activity	Services Availed Status (Job seekers)
I	Counselling	27,479
II	Robotic Interview	3355
III	Personality Development Training	668
IV	EnglishScore	7999
V	Work Readiness Program	4472
Total		**43793**

The details of the curation activities are briefed as below:

I. **Counselling**

   The career counselling services can be availed by job seekers who wish to get an awareness about their career path and understand the various skilling and other options which can help them to build their career. The career counselling will be based on the career assessment which analyzes the attitude, aspiration, career segments, generic skill orientation. The test investigates three aspects of a job seeker such as Skill & Personality acquired by nature (FACE Assessment), Skills & Personality acquired from the environment a person lives in (MTI Assessment and Aptitude and Multiple Intelligence Orientation (MIO). This shall provide a very accurate prediction of career suitability. The assessment needs to be taken by the job seekers before booking the counselling sessions. The slots can be booked through DWMS platform by choosing the preferred time of job seeker's choice.

No of active counsellors	225
Total Counselling completed	27,479

Career Clinic Activities

Career Clinic activity was initiated in order to create an opportunity for Programme Managers to have one to one interactions with the registered job seekers in DWMS and get an overall response from the job seekers on the available jobs and their aspirations. This activity has created an insight on the technical changes required, type of job openings expected, salary range, job location etc. The job postings available in DWMS will be informed to the matching job seekers through the Career clinic and inputs from them will be collected. If they are interested for the posting, they will be guided to apply for the job posting in DWMS.

The activity is continued in all ThozhilSabhas under the supervision of Career Ambassadors.

II. Robotic Interview

The AI based video profiling helps the job seekers to get a live interview feel and boost their confidence to attend the interviews. The job seekers have a provision to use the facility once and can be taken through DWMS web and connect app.

Count of Job seekers availed Robotic Interview: 3355

III. Personality Development Training (PDT)

Personality Development Training (PDT) module has been developed in a view to equip the job seekers to improve their workplace communication, interpersonal skills and overall personality development focussing on the English language. The 16-hour training module is developed with a distinctive focus given to all-round development, through confidence building, teamwork abilities and English communication skills and is given free of cost to the jobseekers registered in the DWMS platform. The PDT program is effectively delivered through **Personality Development Professionals (PDP)**, empanelled by KKEM.

The EOI for Personality Development Professional has been called for with regard to the empanelment process and based on the notification 107 applications were received. From this, 70 profiles have been shortlisted based on the demonstration video submitted with the EOI. Centre for Management Development (CMD) was entrusted with the selection process and subsequently

39 candidates were selected for empanelling as PDP with KKEM. Out of this, 33 PDPs are currently active for conducting the training.

No of active PDPs	32
No of job seekers enrolled	668
No of batches formed	56
No of batches commenced	56
No of batches completed	38

IV. EnglishScore

The EnglishScore British Council's App based test to assess the English language proficiency level of the job seekers and is aligned to the Common European Framework of Reference for Languages(CEFR). This test report can be used by the employers for understanding the language proficiency of the job seekers whereby the initial screening process can be simplified. The test can be taken multiple times as practice tests for improvement. The certificate can be downloaded using the connect code once they achieve a high score.

Total No. Test Takers	7999
C1	438
B2	2001
B1	3835
A2 & A1	1725

I. Personality Development Training (PDT) module is designed to equip the job seekers to improve their workplace communication, interpersonal skills and overall personality development focusing on the English language. This training is intended for all the job seekers who wish to enhance their language capabilities and professional skills

II. Career Support Internship programme envisages to facilitate job seekers with the employers. The three months internship programme onboards the Final year Undergraduates and Post Graduates, also students graduated within the last two years of study as Career Support Executives.

III. Robotic Interview enables AI supported video interviews to get a real time interview experience for the job seekers thus enabling them to attend the real job interviews with more confidence.

IV. Career Counselling module helps the Job Seekers to connect with career counselors and get expert suggestions on the best career path to select based on the personality and aptitude of the job seekers. Job Seeker attends a psychometric assessment and an AI based assessment report is generated and shared with the Job Seekers that includes the suggestions on the matching functional/domain area for each of the individual job seekers.

V. Added English Score – The British Council's Mobile Application based English language test to assess the English language proficiency level which is aligned to the Common European Framework of Reference for Languages (CEFR). Based on the performance in the English Score test, internationally recognized English Score Certificate will be issued to the Job Seeker by British Council.

VI. Added Work Readiness Program (WRP) that includes the sessions on interview etiquettes, confidence building, group discussion, mock interview etc. which will help the jobseeker to attend the interview confidently.

V.   Work Readiness Programme

The jobs seekers will be offered with a free work readiness programme before the interview process if they wish to enhance their confidence and present themselves in a better way. This 15-hour module will give exposure to etiquettes, attitude, resume writing and placement processes, provide presentation and interview skills.The work readiness module is delivered through Kudumbasree and ASAP Kerala for the DWMS jobseekers.

The grooming of the job seekers for the initial 10K job fair was assigned to Kudumbasree and the grooming sessions were completed in all the districts prior to the district job fairs conducted from December 2021 to February 2022.

The grooming sessions by ASAP Kerala is done in various ASAP Community Skill parks and ASAP centers across the State.

ASAP Kerala	No of job seekers enrolled	1235
	No of batches completed	40
Kudumbashree	No of job seekers enrolled	3237
	No of batches completed	17
Total no. of job seekers enrolled		**4472**

Achievements in Skilling

Skilling module of KKEM will support jobseekers to fine tune their skills through skill providers, Government agencies, curated set of Training Providers, industry partners and online platforms. This would also enable registered jobseekers to upgrade their skills throughout their career. The Mission envisages that approximately 30 lakh candidates may require skills training over the next five years period. In the DWMS platform, the existing skill partners of the state were on boarded and their programmes were curated.

Total number of skill programmes curated in DWMS – 196

In order to provide skill training to maximum number of jobseekers registered in DWMS, Expression of interest was invited and 62 skill partners have applied for the EoI. Several meetings were conducted with the existing skill partners, university and higher education partners and industry partners to offer skill trainings, internships and Recruit, Train and Deploy (RTD) opportunities. The details of each of the partners is given below:

Type of Partners	Number of partners discussion initiated	Number of partners on boarded in DWMS
Skilling Partners	31	21
University and Higher Education Partners	14	6
Industry Partners	14	6
Total	59	33

Number of batches commenced	25
Number of batches completed	9
Number of candidates registered for skill training	2647
Number of students trained under scholarship scheme with partners	3352
No. of partners submitted the signed MoU	15

I.Internships

An internship is a time-limited intensive learning experience outside the traditional classroom. Job seekers with no industry experience especially students will be placed in a supervised work-based learning situation with employers for planned learning activities. The internship will also enrich the skills and experience of candidates while attending for interviews. To aggregate the internship opportunities PMU has created for ICTAK and KSUM.

Total Internship openings sourced	84
Total jobseekers registered for internship	358
Number of candidates enrolled for internship	3

II. Recruit, Train and Deploy

Recruit, Train and Deploy is the unique model of skilling by KKEM. Industries who will provide RTD model will be identified and onboarded in DWMS. In this model, industry will shortlist jobseeker and offered with provisional offer letter. After the training in the job role and final offer letter will be issued

Total Internship openings sourced – 380
Total jobseekers registered for RTD – 269

III. Special skilling programme for Neuro divergent candidates

KKEM and Inclusys org are providing opportunities for neuro divergent citizens in Kerala. A year-long awareness campaign has been launched to empower differently abled individuals through skilling, entrepreneurship, digital technology, startup incubation, and empowerment. Inclusys Org Foundation, a Not-for-profit organization envisioned to skill and empower neuro divergent (Autism, Cerebral Palsy, Downs Syndrome, Intellectual Disability, Learning Disability, multiple disability) citizens in IT Digital Technology segment has started offering a course 'Foundation in Data Analysis, Design Fundamentals and Software Testing'. The training has started in 5 centres in Ernakulam, Alappuzha and Thiruvananthapuram districts. This is the first of its kind platform for neuro divergent citizens to be skilled and getting employment opportunities in IT Digital Technology segment. The course includes Data Annotation, Data Analysis, Low code/No code, Software Testing and basic communication & business skills.

IV. Project Lighthouse – Coursera

Changing nature of world of work and the aspirations of learners poses new hurdles to the Higher Education Institutions in general and Universities in particular. By recognizing this important challenge, Kerala Knowledge Mission strives to build partnership with leading Industries and corporates and connect them with its partner organizations and Higher Education Institutions. As part of this engagement activities, KKEM hosted a Round Table with Mr. Jeff Maggioncalda, CEO of Coursera and the team members of coursera on 17th October 2022 at Hilton Hotel. Major industries, Higher education institutions, KKEM strategic partners and govt officials attended the event.

V. Industry Meetups

- In order to develop sector specific industry relevant skill programmes and to increase the industry participation, industry meet ups were conducted at multiple locations with the support of ASAP Kerala.
- Industry meetups were convened to identify new job roles and skill sets that are relevant and in demand by industries through deliberations proposed across skill domains.
- The discussions were on existing and emerging job roles, and identifying skill gaps, among other focus themes.
- The expected job and internship opportunities in industries in general, and in each firm in particular were estimated.
- For each of the proposed Industry meetups, nearly 30 senior representatives from industries, Sector Skill Councils, industry associations, and universities were invited. Industry experts from the following 11 domains put forth their standpoint on industries' role in creating talent, through the series of roundtable discussions. The below are the 11 sectors

Industry Meetups at Infoparks, Cyberparks and Technopark

Industry meetups were conducted at InfoparkCherthala, Government Cyberpark, Kozhikode, UL Cyberpark, Kozhikode and with the industry representatives from Technopark more than 20 industries had attended the meet up from each parks. All the participated industries and the industry Associations have ensured their support towards meeting the objectives of the Kerala skills Express and Kerala Knowledge Economy Mission.

Sl No	Venue	Date
1	InfoparkCherthala	4th Jan 2023
2	GovtCyberpark	16th Jan 2023
3	UL Cyberpark	16th Jan 2023
4	Hycinth, GTECH	23rd January 2023

VI. Launch of Kerala Skills Express

The Kerala Knowledge Economy Mission has started a unique campaign named "Kerala Skills Express" to find talent spots and build talent ecosystems in the higher educational institutions in the state. The program is focusing on 250 colleges across Kerala and will provide an opportunity for talented students to connect with job opportunities and learn about the latest trends in the industry. With the campaign we intend to provide 10000 jobs, 10000 internships and enroll 50000 learners from the Higher Education Institutions across the state into various skill programmes offered by the skill partners of KKEM. The launch of the Kerala Skill Express was conducted on 23rd of January 2023.Honorable Finance Minister Shri. K N Balagopal inaugurated the event and

Dr. KM Abraham, Chief Principal Secretary to CM and Executive Vice Chairperson of KDISC took part in the workshop.

VII. Skill Infrastructure

One of the critical challenges in meeting the target of 30 lakh skill training is the lack of sufficient infrastructure facilities in the state. Knowledge Mission strives to address this through a dual pronged approach i.e., argumentation of existing infrastructure and development of new infrastructure. The project gives a lot of emphasis to create remote work opportunities. Out of the total 20 lakh jobs targeted, 12 lakhs are envisaged as remote and freelance jobs. To achieve this target, sufficient appropriate infrastructure needs to be ensured. The concepts of Work near Homes, Makeshift Vocational Academies and Micro office spaces are planned under the mission.

AR/VR Labs

Augmented reality and Virtual Reality market is projected to grow exponentially in coming years. Even with the huge market demand sufficient training facilities are not available within the state. As it is the right time to launch training programmes and to create skilled professionals in this sector, AR/VR labs along with Green Studios are set up in the 4 Community Skill Park of ASAP Kerala.

Work Near Home

The Government of Kerala has initiated a project for developing Work Near Home office space as part of Kerala Knowledge Economy Mission. Work Near Home Project envisages a distributed network of co-working spaces across the state. With the development of such a network of decentralized workspaces, Kerala can unleash the untapped potential of the women work force and thereby harness the benefit of gig economy in general and knowledge economy in particular. Though Companies encourage their workforce to work from home, this poses greaterchallenges to employees like ensuring uninterrupted power, connectivity, concentrated worktime, a dedicated space etc. at home. The Work Near Home centers are planned as a solution to these challenges. The proposed project "Work Near Home" aims to establish a distributed network of workspace within the neighborhood of employees by augmenting the existing infrastructure facilities available in the locality. These are specifically designed workspaces closer to home which houses small groups of people belonging to multiple organizations, freelancers and solo entrepreneurs.

As part of this a consultation workshop was conducted to take feedback from various stakeholders on 30th November,2022 at Hotel Hycinth, Trivandrum. This has been designed as a focused workshop with a set of curated participants in a symposium mode. Hon'ble Minister for Finance Shri. KN Balagopal and Dr. KM

Abraham, Chief Principal Secretary to CM and Executive Vice Chairperson of KDISC will attend the workshop. Dr.SajiGopinath, Hon'ble Vice Chancellor, Kerala University of Digital Sciences, Innovation and Technology led the Workshop. More than 60 representatives from various sectors like major industry players offering remote jobs, freelance groups, existing co working industries and government representatives attended the event. The workshop provided major inputs from them in Design, Facilities, marketing and sustainability of the project.

Achievements in Demand Aggregation
   I. ICTAK is the co-ordinating partner for KKEM's Demand Aggregation activities. A total of 1487 employers have registered through ICTAK on the DWMS platform so far.
  II. A total of 1964 employers have registered through ICTAK and CII on the DWMS platform so far. ICTAK and CII have brought 162299 Vacancies and placed 11191 candidates in the period of April 2022 to January 2023. 800 companies are connected on a monthly basis and out of that 100 companies are registering on the DWMS. ICTAK has created a dashboard using data studio from July for KKEM.
 III. ICTAK has acted as the coordinator for the various job platforms such as Monster, LinkedIn, Awign&tseek in DWMS. ICTAK also coordinates with CII which has committed to bring 7 Lakh jobs for KKEM.
  IV. NASSCOM conducted a job fair in November 2022 in Thiruvananthapuram where 35 candidates were placed.
   V. ICTAK conducted a job fair in December 2022 in Ernakulam where 105 candidates were placed.
  VI. Ernst & Young (EY), TCS, UST, QuEST and Sun Tech are currently engaged with ICTAK to provide all their job vacancies to candidates in the DWMS portal. An organization called World Malayalee Council where the members are businessmen from around the globe have come into an agreement with KDISC & ICTAK. The companies which are owned by the members of WMC will register as employers in the job portal.
 VII. The following international companies have already added their job vacancies on the DWMS portal as part of the efforts of ICTAK - Voyage Marine Automation, Generative Design Solutions Middle East, Dhanya Group of Companies and Minvera special Purpose Vehicle
VIII. Minvera special Purpose Vehicle has confirmed international apprenticeship for 25 candidates. The company has provided internships for two jobseekers so far. Voyage marine Automation has confirmed 10 International apprenticeship
  IX. NAVIGO, which is a voluntary non-profit organization based in the United Kingdom has entered into an agreement with NORKA through KDISC and ICTAK for providing jobs to health professionals in the UK.

X.   PRATHIDWANI, an organization based in Technopark has signed a MoU with ICTAK for sharing jobs in the IT sector which they aggregate.

XI.   Serikandi Oil Field Services SdnBhd, Brunei have associated with ICTAK and have become an agency for aggregating jobs in the Far East which include Singapore, Malaysia, Sultanate of Brunei & Indonesia.

XII.   ICTAK has entered into an agreement with Open Assembly for creating an Open Talent Centre of Excellence within KKEM.

XIII.   Partnership with the Confederation of Indian Industry (CII) on "Providing Employment to 7 Lakhs Youth from Kerala State and Bridging the Unemployment Gap in Kerala".

Job Sector	No. of Vacancies Aggregated	Percentage of Total
BFSI	4834	5.2%
Healthcare	1961	2.1%
Hospitality	1312	1.4%
IT-ITES	31248	33.6%
Logistics	2173	2.3%
Manufacturing	39647	42.7%
Retail	11701	12.6%
Total	**92876**	100.0%

A total of 7492 candidates have been hired through CII so far.

RTD Model

CII has successfully completed the Recruit-Train-Deploy model at SKF YES centre and provided placement to 18 candidates as Operation Trainee at Bangalore location.

Company	Sector	Position Filled
SKF YES Centre	Production & Manufacturing	18

Job Fairs Organized by CII

The job fairs were operated in both physical and virtual modes. Around 75 physical and 100 plus virtual job drives covering all the districts of Kerala, including mega, capsule and institutional based drives were organised.

Industrial Training Department – Job fairs
- It was decided to conduct Placement Drives across the state exclusively for ITI passed out candidates using DWMS.
- The Convocation Ceremony for the national and state winners of the ITI 2022 exam was sponsored by KKEM.
- The Placement Drive "**SPECTRUM**" is completed in all 14 Districts.

- The Job Fair of Trivandrum District along with the Convocation ceremony were held on January 16, 2023, at Kanakakunnu, Thiruvananthapuram. 185 national and state ITI 2022 exam winners were recognized by Shri V Sivankutty, Hon Minister for Labour and General Education, as part of the convocation ceremony. Hon. Member of Parliament Shri A.A. Rahim, Smt. Mini Antony IAS, Dr.Veena N. Madhavan IAS, and Shri V K Prasanth MLA were also part of the ceremony.

All 14 districts hosted a SPECTRUM job fair and 13731 candidates attended. The job fairs included participation from 752 employers.

Job Fair in association with Infopark Cherthala

Placement drive was conducted in association with Infopark, Cherthala on 28.1.2022. A total of 12 companies with 35 job roles participated in the job fair.

Total candidates registered via DWMS : 5514
Total candidates attended the job fair: 1200

Accelerated Blockchain Competency Development (ABCD) Programme

1) Introduction

Accelerated Blockchain Competency Development is one of the flagship programs for Blockchain competency development in the state. It is envisaged to develop a pool of 25,000 people with skills in the Blockchain technologies to convert the state into a key knowledge hub in Blockchain in the country.

2) Objectives

The primary objectives of the program during the year 2023-24 are as follows:

a. Enrol at least 10,000 people in full stack programming skills.
b. Select at least 8000 people for a three tier Blockchain competency programme through a Full Stack Competency Assessment Framework.
c. Create at least 8000 people with basic skills in Blockchain, 6000 people with advanced developer skills and 1000 as Blockchain architects.

3) Methodology of Implementation

The ABCD program is executed in two stages – In stage 1, around 10,000 people shall be enrolled in a full-stack competency development program executed by Digital University of Kerala (DUK) using its own resources or by leveraging on teachers from engineering colleges. The people trained by ICT Academy are assessed through a Full-stack Competency Assessment Framework. In stage 2, the participants who clear the assessment framework get to Blockchain associate program organized by Digital University of Kerala (DUK) through Kerala Blockchain Academy (KBA). The associates are further trained to become developers and architects. The three courses of ABCD are:

1. Blockchain Beginner course - This course on Blockchain technology covers all the essential descriptions of blockchain technology and its industry use cases. It covers an overview of Bitcoin, Ethereum, different blockchain frameworks such as Corda DLT, Hyperledger and prospects of blockchain technology. The beginner program equips learners with the foundation necessary for developing applications and programs in multiple blockchain domains. The program comes with a comprehensive suite of theory, videos, demos, and hands-on exercises. The beginner program is a first of its kind that offers a complete tour of the blockchain fundamentals, acting as a perfect starting point for newbies to advance their blockchain career.

2. Blockchain Developer course - The intuitively crafted developer programs offer advanced training and certification on Ethereum blockchain and

Hyperledger DLTs to become the industry-leading blockchain developer. These courses' mission is to bridge the knowledge gap and build a global blockchain ecosystem by offering a comprehensive suite of learner guides with well-balanced theories and practical. The in-depth developer training program primarily targets developers with knowledge of basic web development tools and techniques. These courses edify everything about Blockchain, writing smart contracts, developing decentralized applications, etc.

3. Blockchain Architect course - Blockchain Architect Program offers blockchain developers an exciting opportunity to work with the Research &Development Engineers and Scientists of Kerala Blockchain Academy on its live Blockchain projects. The program will help the Blockchain Developers to apply their theoretical and practical knowledge and gain real project exposure to all facets of Blockchain development activities. Blockchain Architect Program is open to candidates who've completed both the Developer Programs from Kerala Blockchain Academy. The Blockchain Architect program will offer a platform for certified blockchain developers to apply their gained subject knowledge in making important decisions concerning the blockchain project they are working on.

4) Achievements in the period

ABCD Course Completion List				
FY	Beginner	Developer	Architect	TOTAL
2018-19	257	154	56	**467**
2019-20	133	122	23	**278**
2020-21	355	60	2	**417**
2021-22	1599	236	3	**1838**
2022-23	1441	898	2	**2341**
Total	**3785**	**1470**	**86**	**5341**

Kerala Blockchain Academy (KBA) has initiated a hybrid and online training programme details of which are provided below.

Hybrid and online training programme details			
Beginner	Developer	Architect	TOTAL
13744	4647	24	18415

Electric Vehicle and Green Energy Programmes

1) **Introduction**

The Energy Policy of the Government of Kerala aims to provide access to affordable, reliable, and sustainable energy to all citizens in the state of Kerala, India. The policy focuses on promoting renewable energy sources, such as solar, wind, and bioenergy, and aims to reduce dependence on fossil fuels. The policy also aims to improve energy efficiency and conservation, enhance energy security, and promote the use of clean technologies. The policy prioritizes the development of local energy systems and the decentralization of energy production, with the goal of increasing the share of renewable energy in the state's total energy mix. Additionally, the policy seeks to encourage private sector investment in the energy sector, support research and development in energy technologies, and improve the energy infrastructure in the state.

In this background, K-DISC has initiated several clean energy programs, thereby strengthening the energy security of the state in the coming years. The programs currently undertaken by K-DISC are as follows:

Electric Vehicle Consortium

Considering the immense potential of transforming Kerala into an ecosystem for manufacturing EV subsystems and components, K-DISC has constituted a consortium comprising of Travancore Titanium Products Limited (TTPL), Vikram Sarabhai Space Centre (VSSC), C-DAC Trivandrum (C-DAC) & Trivandrum Engineering Science and Technology (TrEST) Research Park. With the consortium, we could localise 60-70% of overall EV subsystems and components in the coming years.

Clean Energy Innovation and Business Incubation Centre (CEIBIC)

The Government of Kerala has prioritised the development of a Green Energy Ecosystem and K-DISC has established a Clean Energy Innovation and Business Incubation Centre (CEIBIC) in collaboration with the Energy Management Centre of Kerala (EMC) and Social Alpha, a not for profit platform created by Foundation for Innovation and Social Entrepreneurship (FISE). The initiative aims to promote and support the growth of clean energy and related businesses.

Biofuel Projects

K-DISC has initiated few biofuel projects to promote the use of biofuels as a cleaner and renewable source of energy and reduce the dependence on fossil fuels and thereby helping Kerala in the transition to a thriving low carbon economy. The project also seeks to encourage entrepreneurship in the biofuel sector and create job opportunities for local communities. Few of the projects were focussed on the production of biofuel from water hyacinth, solving the menace choking Kerala's backwaters.

Overall, the project aims to promote the production and usage of biofuels such as biodiesel and bioethanol in the state. Currently, three projects were part of this initiative, they are as follows:

Studies on the characteristics of Eichhornia crassipes (Water Hyacinth) as a source for biofuel

Feasibility assessment for Bioethanol Production from Water Hyacinth Biomass (WHB)

Feasibility study of High - Pressure Biogas Generation for

Sustainable Transportation

K-DISC is working with various stakeholders in a Triple Helix Module, including private companies/ Industry, start-ups, research institutions and academic institutions to implement the project successfully.

2) Objectives

The objectives of the EV and Green Energy Programmes of K-DISC are as follows:

1. Electric Vehicle Consortium
- To bring in an EV manufacturing ecosystem in Kerala.
- To suggest ways of bringing value addition to the mineral rich beach sands of Kerala.

Under the Electric Vehicle Consortium, there are two subprojects they are:

a. Setting up of EV Drivetrain Testing Lab

A commercial EV Drivetrain Testing Lab is being established at Energy Management Centre (EMC), by TrEST Research Park, with the funding of K-DISC. The objectives are as follows:

- Promote Research in powertrain for indigenous technology development.
- Industry institute interaction with collaborative research.
- Incubation and support for startups working in the area of EV Technologies.
- Provide testing facility for EV Technologies in a phased manner.

b. EV Retrofitment & Carbon Financing

K-DISC and TrEST Research Park jointly worked out a proposal for retrofitting existing ICE autorickshaws. The project is envisaged to cut down the carbon emissions from the ICE autorickshaws and support the auto owners, thereby making it an affordable and more environment-friendly solution for promoting electric vehicles in the state.

K-DISC has approached TERI for their support and to investigate the possibility of carbon financing for the project which includes TERI to formulate mechanisms for the proper estimation of greenhouse gas emissions, carbon credit calculation and monetization for the EV 3 wheeler retrofitting.

2. **Clean Energy Innovation and Business Incubation Centre (CEIBIC)**
   - The initiative is broadly focussed on Incubation, Mentorship, Prototype development, Product development, Techno-commercial pilot opportunity, Market access support, and access to Seed Capital.
   - By the end of 2025, 30 enterprises shall be incubated and supported by CEIBIC.
   - 3 innovation challenges are being launched to create a pool of vetted innovations across the globe.
   - Integrating of ongoing innovation activities and challenges of K-DISC with CEIBIC.
   - The programs like promotion of local demand generation in sectors such as Agritech, Energy tech, etc. under Knowledge Mission shall also be linked with the activities of the CEIBIC.

3. **Biofuel Projects**
   A. Studies on the Characteristics of Eichhornia crassipes (Water Hyacinth) as a source for Biofuel – KAU & Jyothi Engineering College

   Phase 1:

   - To study the characteristics of biomass from water hyacinth.
   - To estimate the lipid productivity of WHB.
   - To assess the possibility of biofuel production from WHB.

   Phase 2:

   - To investigate the different routes for biofuel production from WHB

   B. Feasibility assessment for Bioethanol Production from WHB – CSIR-NIIST

   - To generate quantitative data on the biochemical conversion of WHB to ethanol at laboratory scale.
   - To assess and utilise optimized conditions for pilot scale trials to generate data on operational efficiencies, mass and energy balances and therefore assess the technoeconomic feasibility of WHB to bioethanol.
   - It is envisioned that the outcome would provide enough data for strategizing the feasibility of commercial scale WHB based bioethanol plant(s) in the state.

   C. Feasibility study of High - Pressure Biogas Generation for Sustainable Transportation

   - To design and develop a High Pressure Biogas Generation and Conversion to Bio-CNG (HiPrBio) technology for degradation of solid waste.
   - Optimisation of process parameters for biogas generation and purification.
   - Demonstration of an economically feasible technology towards the sustainable generation of Bio-CNG in a decentralised scale.

- ◆ Achieve the goals of the Swachh Bharat Mission and Sustainable Alternative Towards Affordable Transportation (SATAT) initiative.
- ◆ Development of a simulation model and the validation of the same.

3) Methodology of Implementation

1. Electric Vehicle Consortium

The proposed activities by the consortium partners are as follows:

i) *Establishment of EV Drivetrain Testing Lab – TrEST Park*
ii) *Development of Battery Management System (BMS) - CDAC*
iii) Development of LTO Electrode Material – *TTPL*
iv) Characterisation & Performance Evaluation - VSSC
v) Greenhouse emission estimation, carbon credit calculation monetization for 3 wheeler EV retrofitment. – TERI

2. Clean Energy Innovation and Business Incubation Centre (CEIBIC)-EMC & FISE

- Infrastructure for CEIBIC shall be fulfilled by EMC.
- EMC will be coordinator of the activities of CEIBIC.
- EMC will ensure the challenges be fully integrated with the ongoing activities of K-DISC.
- FISE to leverage existing setup of EMC, KSEB, K-DISC, etc.
- FISE to identify synergy development areas for carrying out innovation promotion start-up development programs.
- FISE to provide level 2 innovation support in the areas through Community of Practices (CoPs) established by K-DISC.
- FISE to undertake coordinated projects with Local Governments, MSMEs agencies and National and International level research agencies in Strategic areas for knowledge co-operation and application.
- FISE to devlop system technology transfer and skill-upgradation jointly with academic institutions and skill providers.
- FISE to establish certification programs in carbon neutrality, climate change neutrality etc.
- FISE shall assist its partners to operationalise CEIBIC.

3. Biofuel Projects
A. Studies on the Characteristics of Eichhornia crassipes (Water Hyacinth) as a source for Biofuel – KAU & Jyothi Engineering College

- An Advisory committee for the feasibility study of biofuel production from water hyacinth was constituted with experts from Kerala Agricultural University, Jyothi Engineering College, Catholicate College, GEC Thrissur and Groningen University, Netherlands.
- The project was envisaged to have 2 tracks:

  Track 1: Pilot Study in Kerala
  Track 2: Pilot Study in Jharkhand, Ranchi

- A detailed proposal regarding the use of Water Hyacinth Biomass to produce biofuel was received from Jyothi Engineering College, Thrissur for the pilot study in Kerala.
- The pilot study in Kerala was carried out at Jyothi Engineering College with the assistance of Catholicate College and Kerala Agricultural University. The WHB samples are obtained from Thrissur and Kuttanad.
- The study in Jharkhand was carried out by Shri Vishal Prasad Gupta, Founder, of M/s More Mileage, Jharkhand who has developed an innovative biofuel extraction process using algal biomass.
- Bimonthly review meetings were scheduled to track the progress of the project.
- The project is nearing its completion and the various routes for biofuel production from water hyacinth will be recommended at the end of the project.

B. Feasibility assessment for Bioethanol Production from WHB – CSIR-NIIST

- Water Hyacinth Samples from Alappuzha & Trivandrum are obtained to study the physico-chemical and compositional properties of WHB.
- An ideal pretreatment strategy for WHB
- An efficient hydrolysis process and enzyme blend(s) for the same
- An efficient fermentation strategy using proven yeast culture(s)
- Process for generation of xylan from pretreated WHB
- Data on mass and energy balances for WHB to Ethanol process and on the generation of residues and process liquors
- Data on the possibility of biogas generation
- Techno-economic feasibility of bioethanol from WHB and recommendations on the same.
- Bimonthly review meetings were scheduled to track the progress of the project.
- The major deliverable from the project is scientifically validated data on the feasibility of water hyacinth biomass-based bioethanol plant.

C. Feasibility study of High - Pressure Biogas Generation for Sustainable Transportation

- Proof of Concept and Basis of Design for High-Pressure Bio-gas generation and conversion to Bio-CNG.
- Organise a pilot generation, to adapt the technology available with Industrial Partner.
- Optimization of process parameters (pressure inside the reactor, organic loading rate, pH, etc.) for biogas generation and purification
- Creation of a test rig facility in the Campus, integrate Research work with academic activities and ensure that the value-added product is available for thermal purposes.
- Focusing on academics, there exist a huge research potential in this feld and innovative ideas can be developed in the future, thereby beneftting students in the UG, PG and research scholars. Many international publications can also be produced.

- To undertake simulation studies for the physical model of the components of the High-Pressure Bio CNG Reactor, for optimising the field materials, feed rates and performance.

Bimonthly review meetings were scheduled to track the progress of the project.

4) **Achievements in the period**

   1. **Electric Vehicle Consortium**
   - TTPL lab facility for the battery development was completed.
   - The agreement has been signed between TrEST Research park and K-DISC on March 2022 for the setup of the Drive train testing Lab.
   - Technical committee has been constituted to evaluate and finalize the equipment list for the set up on Drivetrain testing facility.
   - The equipments for the setup of the HV and LV Drive Train Testing Facility is finalized, after approval by the Technical Committee.
   - Agreement has been signed with Energy Management Centre for 2000 square feet of space for set up of the lab.
   - An MoU has been signed with Tata Elxsi for their support for the set up and operations of the drive train testing lab.
   - Technical specification have been finalised and an e-tender has been published in the e-procurement site, etenders.kerala.gov.in, for the procurement of Dynamometers and Battery Emulators. AVL India Pvt. Ltd. is identified as the vendor through the tendering.
   - For the electrical works, including the installation of the transformer, Kerala Electrical and Allied Engineering Co. Ltd. (KEL) has been identified as Project Management Consultant, and an agreement with KEL is being signed.
   - KSEB has provided confirmation regarding the power allocation of 800 KVA, at the site where the lab is planned to be set up.
   - Battery Development: Batches of LTO electrode material samples were manufactured by TTPL and material level charecterisation is done by VSSC.
   - Prototypes of 5Ah LTO cells have been developed and performance is being evaluated. 20Ah cells are planned to be assembled using the hardware with a 2W demonstration in the coming months.
   - A new lab facility for the EV activities focussing on battery development is being established at TTPL space.
   - C-DAC finalised the System Requirement Specification (SRS) for the development of BMS for the LTO cells which could be indigenously developed in the state.
   - White paper on BMS architecture is being formulated by C-DAC.
   - IIT Madras was onboarded to the advisory body of the program where the safety and thermal management issues with lithium batteries are being investigated and thermal modelling for BMS is underway.
   - K-DISC presented its work in EV in a workshop "Exploring Business Opportunities in Kerala for Electric Vehicle Components Manufacture" organised by RIAB, Govt. of Kerala on October 2022.
   - MoU was signed between K-DISC and TERI for the EV Retrofitment Project which includes TERI to formulate mechanisms for the proper estimation of

greenhouse gas emissions, carbon credit calculation and monetization for the EV 3 wheeler retrofitting.

2. **Clean Energy Innovation and Business Incubation Centre (CEIBIC)**

   - A tripartite MoU was executed between the Energy management Centre – Kerala (EMC), Kerala Development and Innovation Strategic Council (K-DISC) and Social Alpha, a not for profit platform created by Foundation for Innovation and Social Entrepreneurship (FISE).
   - 1st Clean tech challenge was launched in the month of August 2022
   - Applications of 1st Clean Tech Challenge are evaluated and the winners will be announced in the month of March 2023.

3. **Biofuel Projects**

   A. Studies on the Characteristics of Eichhornia crassipes (Water Hyacinth) as a source for Biofuel – KAU & Jyothi Engineering College

   - Constitution of Advisory committee for the feasibility study in Kerala.
   - Completion of Phase 1 of the Feasibility Study in Kerala. A report on the findings and recommendations is submitted to K-DISC
   - A team from Kerala visited the biofuel processing units in Ranchi, Jharkhand to investigate the feasibility of biofuel production from water hyacinth.

   B. Feasibility assessment for Bioethanol Production from WHB – CSIR-NIIST

   - Completion of compositional analysis of WHB from Aakkulam and Alappuzha.
   - Optimized wet/dry processing and pre-treatment strategy.
   - Developed an efficient saccharification process for hydrolysis of pre-treated water hyacinth biomass using commercial/in-house enzyme cocktails.
   - Optimized Fermentation process development using water hyacinth hydrolysates to achieve maximal ethanol yield.
   - A proposal submitted by CSIR-NIIST for the establishment of 2G Bioethanol in Kerala to ONGC was shortlisted for presentation.

   C. Feasibility study of High - Pressure Biogas Generation for Sustainable Transportation

   - Procured tabletop reactors
   - Completed of tabletop reactors
   - Completed the procurement and installation of a gauges.
   - Completed simulation model on Acidogenesis.
   - Tabletop Reactor Installation: 80% Complete.
   - Experimentation (Methanogenesis): 30-day trial on 2nd stage tabletop reactor completed, and biogas pressurised up to 2 bar.
   - CET floated tenders for gas analysers and containers.
   - Tender documents completed.

Technical committee meeting took place and vendors are being finalised.

Kerala Medical Technology Consortium (KMTC)

1) Introduction

A consortium to establish Kerala as one of the medical technology development and manufacturing leaders over the next decade shall be established bringing the various leading technology research and clinical institutions in the state in a common platform.

2) Objectives

- Development and manufacturing of cutting-edge medical technologies and healthcare solutions that are competitive in internationalmarkets.
- IdentificationofspecialclinicalneedsrelevanttoIndiansocietyandaddressthem with innovative and cost-effective solutions.
- Multidisciplinary R & D efforts to address clinical needs that have minimal or low commercial potential, with significant support from the government.
- Development of appropriate environment and skilled workforce to attract global industry leaders to Kerala to support its economic growth and development.
- Creation of high paying and sustainable jobs.
- Establishment of Kerala as a destination for medical and business tourism by utilizing its advanced healthcare delivery systems and national leadership inhealthcare.

3) Methodology of Implementation

KMTC aims to facilitate the MedTech Ecoystem in Kerala by bringing together key stake holders in Research & Development, Academia, Healthcare, MedTech Companies, Start ups and the Government in bridging the gaps and empowering individuals and institutions to foster the growth of MedTech in the State. Building on already available resources and expertise in the leading medical R&D institutions like Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST) and Rajiv Gandhi Centre for Biotechnology (RGCB), premier universities like Cochin University of Science and Technology (CUSAT) and Kerala University of Health Sciences (KUHS) and utilizing the support of local industries like TTK Healthcare, Terumo Penpol etc., the KMTC aims to bring in international expertise and state of the art facilities to nurture world class medical innovations as well as technology development capabilities in the State. The Vision of KMTC is to establish Kerala the MedTech Hub of India by 2032 and aspire to be one among the top 20 globally.

The KMTC ecosystem is modelled around the competitive cluster environment concept. It is conceived as a new "Beyond Cluster" model where the diverse stakeholders and relevant entities will interact and iterate innovations between themselves and evolve into commercial ventures and partnerships organically. The ecosystem will be developed by bringing together and empowering all the key institutions, and defining their relevant roles, setting up new ones to fill the gaps, skilling talent, enhancing capabilities and fuelling the growth with critical infrastructure and appropriate incentives.

4) **Achievements in the period**

MEDICA Trade Fair 2022 - Düsseldorf, Germany

1. The KMTC team comprising of Mr. Harikishore IAS, MD KSIDC, Mr. Anoop Ambika, CEO, Kerala Start-Up Mission, Mr. C. Padmakumar, Special Officer KMTC-KDISC and Mr. Rejeesh G R, General Manager (Marketing) attended the Medica 2022 Trade Fair from 14th to the 17th of November 2022.

2. The team identified and met country specific MedTech organisations, trade bodies, and global MedTech Companies. The team presented the MedTech Cluster Ecosystem Model at Kerala & the Opportunities it provides. The delegation met with Government Organisations, Universities, Research Institutions, Medical Device Companies and Start Ups.

3. The delegation was able to meet up with country representatives from JETRO (Japan), South Korea, Israel, Taiwan. In addition, discussions were held with representatives of Germany, UK, Holland, France, Belgium, Israel and Malaysia.

4. The discussions with different organisations from Taiwan, including the Hsinchu Science Park and the industry Technology Research Institute were very fruitful and the two sides agreed to exchange visits. The Deputy Director General of the Hsinchu Science Park invited the KMTC team to visit Taiwan.

5. Discussions held with the Kurinji State in Germany and with the Fraunhofer Institute of Germany were significant and very promising.

6. Discussions were held with the Malaysian Rubber Council and the Malaysian Plastics Promotion Council. There is good potential for collaboration and business between the Rubber Board in Kerala and the Malaysian Rubber Council and between suppliers of components and intermediate products based in Kerala.

7. Discussions held with representatives of the Israeli Export Institutes and Israeli start-ups shows good potential for collaboration, especially amongst start-ups and research organisations.

8. The delegation met with the Accounts Manager of Info Medica who represent Arab Health to finalise the participation of the Kerala Government at the Arab Health.

Various stakeholder meetings and discussions were held in this period to strengthen the KMTC initiative. Key meetings include:

1. KMTC Healthcare Summit conducted in Kochi on 25 June 2022 in collaboration with Kerala Startup Mission (KSUM) with participation from healthcare providers, industry, startups, researchers, and students.

2. KMTC Stakeholder Connect Meet conducted on 23 August 2022 in collaboration with Central Laboratory for Instrumentation and Facilitation (CLIF), University of Kerala, monthly one-day Stakeholder Connect Meet.

3. A draft incentive scheme for promoting investment in the state in this sector has been drafted by KMTC.

4. Meeting with Mr Muthu Singaram, CEO, Health Technology Innovation Center, IIT – Madras

5. KMTC Stakeholder Connect Meet held at Malabar Cancer Center on 24 September.

6. Panel discussion – "Medical Entrepreneurship Opportunities and Challenges" at Trivandrum Medical College & Hospital on 18 September.

7. Visit of InvestIndia team from 19 to 21 September 2022.

8. Stakeholders meeting on Medical Devices & Life Science 2022 – 27 October

9. Panel discussion on "Patient Care and IoMT" moderated by Special Officer, KMTC at first IoT Tech Summit 2022 on 28 October

10. Kerala Industrial & Commercial Policy – 2022 – interaction with Industry Stakeholders

11. Panel discussion "Accelerated Growth for MSME in Kerala: Opportunities and Challenges" organized by the Digital University of Kerala on 21 October

12. SCTIMST Conclave – 17 & 18 October 2022

13. Stakeholder Connect meet on Translational Research and Technology Transfer in Medtech at CUSAT on 29 November. Participation from SCTIMST, KMCT Group, TiE Kerala, NIT – Calicut, SCIIC IIT Kanpur, SFO Technologies, Dynamic Techno Medical, Agappe Diagnostics, CITIC CUSAT

14. Visit by team Vitaliz Biosciences Pvt Ltd, Bangalore

Efforts taken to strengthen partnerships during this period:

1. KMTC has established relations with Research institutions in the state :- Sree Chitra Thirunal Institute of Medical Sciences & Technology (SCTIMST), Marketing Medspark in Kerala Life Sciences Park (KLIP), Rajiv Gandhi Centre For Biotechnology (RGCB), Central Laboratory for Instrumentation And Facilitation (Clif), University of Kerala, Electronics Regional Test Laboratory(ERTL) – South, Centre for Development Of Advanced Computing (CDAC), Research & Innovation Network Kerala (RINK), Kerala Startup Mission (KSUM), Kerala University of Digital Science, Innovation & Technology (KUDSIT), Cochin University of Science and Technology (CUSAT), University of Trans-Disciplinary Health Sciences and Technology(TDU), Bangalore.

2. Association of Healthcare Providers of India (AHPI) - Kerala Institute of Medical Sciences (KIMS), Aster Healthcare, Malabar Cancer Centre (MCC), Government Medical College & Hospital, Trivandrum, Sree Chitra Tirunal Institute of Medical Sciences & Technology (SCTIMST), Caritas Hospital, Kottayam

3. Interactions with Industry - SFO Technologies / CSEZ, TERUMO INDIA / DELHI

4. Interactions with NITI Aayog / Delhi and Invest India / Delhi. The Invest India team visited Kerala to study the MedTech Ecosystem in the state and will help promote the ecosystem in the target countries for potential investment opportunities.

5. Meeting with M/s Karkinos Healthcare - a proposal to foster Cancer Care and Research in the State was submitted to the Industries Department for consideration and further decisions

6. Signed MOUs with University of Kerala on Government of India's SATHI program, Kerala Start up Mission, and Social Alpha, Bangalore

7. Draft Incentive Scheme for Medical Devices was submitted to the Industries Department for consideration into the New Industrial Policy.

8. The KMTC team attended the Knowledge Translation (KT)- Cross Disciplinary National Conference and Hands-On Workshop Organised by the Kerala State Higher Education Council at CUSAT in December.

9. KMTC also organised its monthly stake holder connect meet at CUSAT on the subject of fostering Translation Research in MedTech in the State. The different stake holders from the Academia, Research & Development, MedTech Companies, hospitals, and the Government stressed the critical importance of Translational Research in continuous development of MedTech in the state. The highlight of meet was the session by the Research Establishment Officer (Research and Innovation) of IIT Kanpur who

showcased the endless possibilities in innovation through Translational Research. KMTC will work with IIT Kanpur in fostering the translational research environment in the State of Kerala with specific focus on MedTech.

10. Proposal received from SCTIMST for expansion project in Bio 360 Park which has been submitted to the Industries Department for due consideration and decisions.

11. DPR received from iOrbit Technologies, Bangalore for setting up of expansion unit in Kerala

12. Business Discussions and visits to the Bio 360 Park with the Senior Leadership team of Vitaliz BioLife Sciences Pvt Ltd, Bangalore to set up their manufacturing facility at the Bio 360 park at Thonnakkal. Vitaliz has committed to setting up their facility at the Bio 360 Park at Thonnakkal.

13. KMTC has initiated discussions with Terumo Corporation Japan to discuss the possibilities of setting up their proposed a). Corporate Research and Development Center b). Global Digital Lab and c). the Global Shared Services Centre here in Kerala. KMTC led the team from KSUM and KDU in presenting the capabilities of the state in the above-mentioned areas to The Group Executive Officer of Terumo Asia Holdings, the Managing Director Terumo India and The Managing Director, Terumo BCT India.

14. KMTC is also taking the lead in facilitating the visit and meeting up of Mr. Shinjiro Sato, President & CEO of Terumo Corporation, Japan with the Hon.Chielf Minister of Kerala in February 2023 in this regard. This visit which is in continuation of the Hon. Chief Minister's visit to the Global Research & Development Centre of Terumo in Japan in 2019 is aimed at fostering the long-standing association of Terumo Corporation with Kerala and in showcasing the future possibilities that exists for collaboration in the field of MedTech.

Arab Health Dubai

In alignment with the priority of the Govt of Kerala to promote sunrise sectors like the Medical Devices / Medical Technology sector, and in accordance with the objectives of the Vision and Mission of Kerala Medical Technology Consortium (KMTC), the KMTC Coordination Committee gave the go-ahead for a delegation representing the state of Kerala to participate and exhibit at Arab Health 2023 at Dubai, United Arab Emirates (UAE) from the 30th of January 2023 to 2nd February 2023.

KMTC took the lead in organizing and coordinating the delegation's participation at the event. KMTC partnered with Kerala State Industrial Development Corporation (KSIDC) and Kerala Startup Mission (KSUM), to present a holistic

cross-section of the Kerala MedTech Ecosystem and the opportunities for manufacturing and research, innovation, and development.

The delegation consisted of three members from KMTC, including the Special Officer, and two members from KSIDC, including the Managing Director, and two members from KSUM, including the Chief Executive Officer, apart from twenty members representing their ten Startups and five members representing three companies from the Medical Devices / Medical Technologies industry in Kerala.

The participation at the 33rd Edition of this Annual Global Event for MedTech , helped achieve the following objectives :

Setting up the booth at Arab Health 2023 along with KSIDC / KSUM - showcasing the Kerala MedTech Ecosystem and Promote the Cluster Ecosystem in Kerala
Enable Existing MedTech Companies/Select startups to showcase their products/technologies to the global markets and look for partnerships
Identify Potential Investors & schedule one to one meetings with them
Identify HNIs & have one to one discussions with them on potential business opportunities
Prospecting & Qualification

Kerala Medical Technology Consortium (KMTC) invited a group of high-profile business leaders and investors to a short interactive and networking session to showcase the immense potential for research, development, manufacturing, and entrepreneurship in the Medical Technology / Medical Devices sector.

H.E. Dr Aman Puri, Consul General of India, Dubai delivered the inaugural address to a venue packed with established leaders of business and industry from the Indian diaspora as well as the United Arab Emirates. The event was attended by stalwarts like Mr Essa Al Ghurair, Chairman, Essa Al Ghurair Investments, Dr M I Sahadulla, Chairman & Managing Director, Kerala Institute of Medical Sciences (KIMS), Dr Azad Moopen, Chairman, Aster DM Healthcare, Mr V K Mathews, Chairman, IBS Software plc and Mr Thomas John, Chairman & Managing Director, Agappe Diagnostics Ltd among others.

"A number of favourable factors make Kerala the ideal destination for high quality, cutting-edge Medical Devices and Medical Technology projects, including the extensive research infrastructure and capabilities within the state, the renowned low-cost-high-quality public healthcare model as well as availability of highly skilled talent," said Special Officer of KMTC and erstwhile

Chairman & Managing Director of Terumo Penpol Ltd. "Kerala is poised to become the regional hub for the sector in the next decade," he added.

Senior members of the Indian business community shared their success stories of doing business in Kerala, while MD, KSIDC detailed the latest incentives and policies to stoke investments in the state and ease the process of doing business. CEO, KSUM presented the vibrant and inclusive startup ecosystem being promoted and fostered within the state, with strong infrastructure and incentives.

Kerala Genome Data Centre (KGDC)

1) **Introduction**

Kerala Genome Data Centre (KGDC) is a proposal to generate, curate and publish genomic data relevant to medical, agricultural and livestock sector, in line with international models such as "UK Biobank". It is proposed to establish a high-capacity data centre capable of storing and processing large amount of genomic data (in the campus of the University of Kerala), which will be a critical base for Research institutions, Hospitals and Biotech companies to provide personalized medicine and develop new products, and Bioinformatics and Diagnostic Start-ups and Software companies to create value added platforms and tools using AI and Machine Learning. Our goals are in line with the KKEM vision of transforming Kerala into a Knowledge society.

This centre plans to generate and store the following data in four domains:

- Human Genomics: 10,000 genome sequences of Kerala population and genetic variant analysis with clinical data to develop a genetic catalogue for Kerala population.
- Plant Genomics: 100 genome sequences of important plants including genome sequencing, expression analysis, variant analysis, trait mapping, bar coding, molecular phylogenetic analysis, and marker development for plant breeding.
- Animal Genomics: 20 genome sequences of animals including genome sequencing and expression analysis, variant analysis, bar coding, molecular phylogenetic analysis, and marker development for animal breeding.
- Microbial Genomics: 1000 genome sequence data for human, plant & animal pathogenic microbes to enable investigations into disease causing genes, variant analysis, phylogenetic and secondary metabolism analysis.

2) **Objectives**

- Genetic catalogue correlated with clinical data for Kerala population and knowledge on potential health risk factors, develop insight into disease-causing variants and susceptibility of population segments to specific diseases.
- Genomic markers of selected agronomically and medicinally important plants and identification of key genes responsible for important agricultural traits and biosynthesis of medicinally important biomolecules.
- Genomic markers of selected economically important animals for the sustainable development of economy of the livestock, fisheries, and poultry sector.

- Marker data for all selected animals and plants to assist breeding programs and Genomic data to decipher the molecular mechanism of disease-causing pathogens.

Key benefits of the project:

- Improve healthcare outcomes: With the genomic data our researchers would be able to identify early markers for diseases within a certain population group, which would enable early diagnosis and significantly increase the chances of successful treatment. Hospitals will be able to provide better diagnostic and personalized treatment to patients.
- Skill upgradation: KGDC would be able to train at least 1000 people in Bioinformatics and Data analysis for the genomics workforce, directly and by facilitating third party providers to use the Data centre.
- Create Jobs: Companies in the Pharmaceuticals, Agricultural seeds, Poultry, Cattle and Bioinformatics sectors will be keen to leverage the data available in KGDC. The Government can set up the policies of allowing only companies with adequate presence in Kerala to use the data. This can create at least 5000 new high paying jobs and significant investments in Kerala at various localities like the Bio360 park and the different Agroparks, over the next 5 years. Based on the data sharing policies and IP granted, the total investment that can brought in can vary from INR 500 Cr. to INR 2,000 Cr.
- Research Platform: KGDC would become the Genomics backbone of all the 125 odd Life Sciences Research organizations in the State. Through Bio-curation, the State would be able to map all its genomics resources under one roof.

3) **Methodology of Implementation**
Key details on proposed implementation of the project:
The key project collaborators initially are University of Kerala, Digital University, Kerala University of Health Science, Kerala Agricultural University and SciGenom Research Foundation. These are some of the premier R&D institutions in Kerala working in genomic area. Efforts will be made to bring all Life Sciences organizations to collaborate and network. Estimated cost of INR 200 Cr. over 3 years. An Ethics Committee constituted by the Universities & Govt. may draw out guidelines to address ethical and social issues and concerns. The Project will also follow Bio-Tech PRIDE guidelines on Data publishing and sharing brought out by Govt. of India in July 2021.

4 Achievements in the period

A project plan for activities that could be immediately undertaken has been planned. A core team to work on the immediate action plan has been positioned.

Centre of Excellence in Microbiome

1) Introduction

KDISC in collaboration with Kerala State Council for Science - Technology and Environment (KSCSTE) and Rajiv Gandhi Centre for Technology (RGCB) is establishing a Centre of Excellence in Microbiome for the State of Kerala. The major objective of the CoE is to support cutting-edge research in the domains- Human, Animal, Aquatic, Plant and Environment, by bolstering the One Health Approach with numerous multidisciplinary collaborations at the local and international levels. Complementing strong program of lab-based research, the CoE has to establish a core of expertise and technologies in data analytics as well. It also aims to create a genomic database of microbiome, to catalyze and support research, development and need-based therapeutic intervention and also to promote and support start-ups and entrepreneurs for manufacturing the products to cater to the State's needs.

2) Objectives

- To be a significant global centre that coordinates interdisciplinary research, cross domain collaborations and innovative product development to popularise the importance of microbiota in One Health.
- To create Spatio-temporal mapping of microbiome data utilizing big data technologies such as IoT, AI and data analytics.
- To create a genomic database that could harness further research and development to understand the microbial interactions better.
- To catalyse and support research, development and need-based therapeutic interventions to cater to the State's needs
- To develop new tools using emerging technologies, leading to exemplary research work, to promote and support start-ups and entrepreneurs
- To contribute to the social, economic and environmental development of our State towards the fulfilment of sustainable development goals.

3) Methodology of Implementation

The CoE in Microbiome plans to execute the following Six domains with specific objectives as follows:

Human Microbiome

- To study the microbiome variation and resistome analysis in various niches.
- To study the association of microbiome with various human disease conditions prevalent in the State
- Development of prebiotics, probiotics, synbiotics and mining of healthy gut microbiome to pick bioactive metabolites.

- To focus on Microbiota reinstitution therapy on various disease conditions and its follow-up studies.

Animal Microbiome

- Understand the 'best' microbiome from a production perspective (food security), better health (animal welfare), low methane production (climate change)
- To develop bio-therapeutic products, new diagnostics and novel antimicrobials
- To address wider AMR (Antimicrobial resistance) issue in the community
- Wildlife conservation: Changes in microbial community can affect fitness of the host.

Plant Microbiome

- To benchmark and understand the microbiome associated with selected crop plants endemic to Kerala
- To develop the possible culturable core microbiome having positive influence on productivity, enhanced tolerance towards biotic and abiotic stress, improved nutritional and nutraceutical quality of the selected crops.
- To develop a synthetic "Minimum Effective Microbiome Set" (MEMS) for selected crop for plant and human health improvement.
- To evaluate the MEMS in the field, develop it as a package of practice and its commercialization at local and global level.

Aquatic Microbiome

- To target improved fish health through manipulation of gut microbiome and to achieve increased aquaculture production.
- Production of nutritionally enriched safe fish for improved human health and microbiome research for AMR mitigation through a cleaner environment.
- To understand the cryptic pathogen diversity in aquaculture systems to predict the risk associated with development of outbreaks
- Surveillance of resistome in aquatic environment

Environment Microbiome

- Establish Environmental Microbiome Observatory in Kerala
- Promote Research, Entrepreneurships and viable Commercial spinoffs
- Develop Bio inspired innovative solutions from Nature
- Creation of enhanced ecosystem and human health, circular waste management and bio-innovation linked entrepreneurial spinoffs.

Data Labs

- For Bioinformatics analysis and to handle the Big Data derived from the above domains
- To understand the microbial-host interplay, as well as to predict and gain insights into the synergistic and dysbiotic connections.
- To foster the development of innovative diagnostic applications.

4) Achievements in 2022-23

- A working group committee constituted by K-DISC with eminent persons working in reputed R&D institutes, University and Industry sectors explored the prospects of setting up of this Centre of Excellence in Microbiome in Kerala and developed the Detailed Project Report and submitted to the Government
- Hon'ble CM in a meeting on 17 November 2022 has given in principle approval for the project
- Constitution of the Steering Committee chaired by Chief Secretary to oversee the establishment of the CoE

Centre of Excellence in Nutraceuticals

1) Introduction

Center of Excellence in Nutraceuticals was announced in the Government of Kerala Budget Speech 2022-23. Nutraceuticals are food products that provide the body with medical or health benefits in both therapeutic and prophylactic mode. They have more health benefits than food items and provide specific nutrition, but less than pharmaceutical products such as drugs, which have targeted effects. Kerala being the Herbal/Ayurveda/Spices/Marine food capital of India, with proper planning, this opportunity can be capitalized on and turn into a big success. A center of excellence that can cater to a nutraceutical manufacturing cluster can be envisaged in an already existing Biotechnology ecosystem like Bio360 in Thiruvananthapuram. K-DISC will facilitate a program to connect research centres, start-ups, and other stakeholders working in this field. An expert team will be positioned to create the concept note for creating a program for Nutraceutical in Kerala.

2) Objectives

Short-term objectives

To identify potential Research and Development (R&D) Institutes/ University departments working in the relevant field and build a team that can gather information/ literature on herbal, traditional, and tribal practices around the world and evaluate it in the context of Ayurvedic and traditional practices in India backed by ancient text and other practices.

To provide opportunities to MSMEs and to initiate start-ups to make the nutraceutical products already evaluated and identified by the researchers, make available to the public.

Long-term objectives

To screen various nutraceuticals identified by the research centers, for their therapeutic potential against metabolic and lifestyle diseases in the State as well as for boosting the immune system to fight against these diseases.

To validate it in the context of modern evaluation parameters and select the most potent nutraceuticals for each disease type and general health.

To generate start-ups to manufacture Nutraceutical products for the public's well-being.

3) Methodology of Implementation

The CoE in Nutraceuticals is envisaged to be set up in 2 phases as an Industry endeavor aided by research rather than a research-led industry with a focus on creating an ecosystem with Multiple Small and Medium-sized Enterprises (MSMEs) and startups involved in the field of nutraceuticals. All research carried out in association with the CoE shall augment the industrial component. The core of the CoE will be the development of the Nutraceuticals industry of Kerala with a multi-stakeholder approach including the support mechanism for the existing firms/business in the Nutraceutical field.

- Initiating a business/research park for nutraceutical products.
- Developing research proposals, which will be submitted for research grants from the park.
- Leverage the research capacity of the potential partners identified viz. Rajiv Gandhi Centre for Biotechnology (RGCB), Thiruvananthapuram, Jawaharlal Nehru Tropical Botanic Garden and Research Institute (JNTBGRI), Thiruvananthapuram, Central Laboratory for Instrumentation and Facilitation (CLIF), Thiruvananthapuram, Institute for Advanced Virology (IAV), Thiruvananthapuram, Central Marine Fisheries Research Institute (CMFRI), Kochi, Govt. Ayurveda College (GAC), Thiruvananthapuram, Central Food Technological Research Institute (CFTRI), Kerala Agriculture University (KAU), Thiruvananthapuram, Bioscience Research and Training Centre (BRTC - KVASU), Thiruvananthapuram, Kerala University of Fisheries and Ocean Studies (KUFOS), Kochi
- Product prototype development and small scale manufacturing of nutraceuticals products
- In a public private partnership mode, establish a startup ecosystem with multiple SME's from the area of nutraceuticals
- Enhancing the ecosystem for fostering research and manufacturing of Nutraceutical products by expanding the Research & Development facilities and collaborating with more National & International institutions.

4) Achievements in 2022-23

Developed the Preliminary Project Report with the support of RGCB and submitted to Government for approvals

Programmes on Value Added Products

In 2022-23 two projects were undertaken under value added products

1. Climate Smart Coffee Programme, Wayanad
2. Neera Value Chain Transformation

Climate Smart Coffee Programme, Wayanad

1) Introduction

Taking into consideration the ecological fragility of the Wayanad Western Ghats and the impact of climate change in the region the Kerala government announced the Carbon Neutral Wayanad initiative in 2019-20. Agroforestry models around the Robusta coffee cultivation in Wayanad is seen as a promising meeting point for improving farmer income and increasing climate resilience and adaptability. The Government has initiated work on setting up a coffee processing unit in Wayanad for value addition, improving productivity, and creating a Wayanad Coffee Brand. K-DISC's Climate Smart Coffee Programme is designed to complement the commercial Coffee Park with knowledge and technology inputs and facilitate research, experimentation, and innovation to improve the Coffee Value Chain productivity, ensuring sustainable development practices, and ensuring equitable sharing of benefits.

2) Objectives

- To determine the best farm management practices and harvesting practices suited for Robusta Coffee cultivation in Wayanad in association with local, state level, national, and international institutions.
- To create a comprehensive knowledge repository on Coffee farming practices, harvesting, and post harvesting methods and technologies with a view to identifying best practices and improving these processes.
- Create a knowledge hub with national and international institutions for knowledge co-creation and diffusion.
- To complement the proposed Coffee Park with knowledge inputs including, but not limited to, on ground research, documentation, knowledge dissemination through workshops, seminars etc.

3) Methodology

1. **Creating a Package of Practices to utilise the GI tag of Wayanad Coffee:** The Coffee Board has already registered "Wayanaad Robusta Coffee" under the Geographical Indicators system. A package of practice centred around the GI tag could be used for the Government's vision of creating a brand for Wayanad Coffee. The package of practices could also include elements of

carbon neutrality, agroforestry, and use of renewable energy which could be finalised in association with field experts in Netherlands and Kerala.

2. **Scientific Collaboration:** There are offers of collaboration from Indian and international science and social science institutions such as IISc., IIMs, IITs and Dutch institutions such as Gronigen and TU Delft Universities. These collaborations will be in areas such as carbon emissions, bio-diversity and social impact. As part of this collaboration, Indian and international scientists will participate in the Wayanad program. These international institutions will also host scientists and teachers from Kerala Universities in the Netherlands to build a bridge for sharing latest knowledge with the farming community. The programme will aim to create a Knowledge Centre in Wayanad to facilitate this.

3. **Watershed Studies**: Watershed studies that can provide data on production of coffee, rainfall, temperature, and biodiversity that can be collated from individual farms in the watersheds. The on-going work in Wayanad on rainfall and temperature monitoring in partnership with universities in Kerala and farmers in Wayanad can expand their work into the coffee areas. MSSRF has offered to support this work along with a network of scientists and teachers from Kannur University and NIT Calicut. The potential for using remote sensing technologies for geo-tagging trees would also be a crucial component. All these can also contribute to better possibilities for adapting to changing climate and prevention of disasters.

4. **Adoption of Technology:** Adoption of technology for aggregation of produce and participation of banks and financial institutions is required to achieve improved economic returns for Wayanad farmers. Data also needs to be dynamically collated from farm locations in the watersheds to conduct scientific studies on production, economic returns, biodiversity and climate impact.

5. **International Model for Climate Change:** The grass-roots initiatives in Wayanad on carbon studies has attracted global attention and won the solidarity and support from many quarters around the world. It is believed that the Wayanad program can be a global model for improving the lot of farmers battling climate change and improving the incomes of farmers.

6. **Complement the Coffee Park:** A Coffee Park is envisaged in Wayanad under the Industries Department. K-DISC will partner in a co-ordination role. The industries department will take forward the programme of creating the hub and spoke processing units for improving coffee value chain in Wayanad.

4) **Achievements in 2022-23**

- In April 2022 a Dutch delegation visited Wayanad comprising of representation of Dutch business interests (MVO), academic representation (TU Delft and University of Groningen), and quasi-governmental organisation (NL Works). The team visited coffee plantations, processing units, and conducted multiple meetings with various stakeholders. Discussions were held with Panchayat leaders as well as the Hon Minister for Law, Industries, and Coir and the Principal Secretaries of the LSGD, Industries, and Agriculture departments. Samples of coffee from Brahmagiri Development Society and Biowin Agro Research were taken back and received a high cupping score of 84 and 86 respectively.

- K-DISC has designed a knowledge programme to complement the hub and spoke model coffee park being established by the Industries Department and KINFRA in Wayanad. A knowledge co-creation model is envisaged in partnership with state level, national, and international partners. Activities to formally sign an MoU with TU Delft and University of Groningen have been initiated.

- A Coffee PMU is established in association with Center for Management Development (CMD). The PMU is led by a retired civil servant who resides in Wayanad. He has also been nominated to head the Detailed Project Report (DPR) review committee that will vet the DPR for the Coffee Park to be established by KINFRA.

- In association with PUM Netherlands an expert from Netherlands conducted a two-week on-ground study of the coffee value chain and made recommendations.

- Four workshops were conducted in Wayanad in 2022-23 in association with MS Swaminathan Research Foundation (MSSRF). The workshops were a platform for discussion between farmers, farmer organisations, academic institutions, and government agencies. This enabled knowledge sharing and creating a common understanding of the situation in Wayanad. The workshops had participation from Kerala Agricultural University, Coffee Board, small farmers association, all panchayats in Wayanad, NIT Calicut, College of Engineering Kannur, Thanal, Federal Bank, Brahmagiri Development Society, Biowin Agro Research, State Planning Board, KILA, KFRI among others.

Neera Value Chain Transformation

1) **Introduction**

The vascular sap collected from immature unopened coconut inflorescence is popularly known as "Neera" in fresh form. It is a sugar containing juice and is a delicious health drink and a rich source of sugars, minerals and vitamins. It is tapped from the coconut inflorescence and is filtered, pasteurized, and bio preservatives added to preserve the product. Tapping can be done for six months in a year.

Coconut Neera is highly susceptible to natural fermentation by Saccharomyces cerevisiae. In order to stop the fermentation, it is required to control the microbial growth in fresh neera. Various attempts for developing technology for long term preservation of Neera using anti fermenting agent and/ or employing centrifugation and pasteurisation have found limited success.

2) **Objectives**

To create a viable business model supported by technology and innovation for the revival of Neera value chain in Kerala in one year.

3) **Methodology**
- The Dairy Plant and Experiential Learning Centre under the Faculty of Dairy Sciences, Kerala Veterinary and Animal Sciences University (KVASU) has tried out an alternative processing method. Instead of pasteurisation, Ultra-high temperature processing (UHT) utilizing Plate Heat exchanges and Tubular Heat Exchangers was used.
- KVASU has proposed an Industry-academia partnership between The Verghese Kurien Institute of Dairy and Food Technology (VKIDFT), KVASU and Rich Dairy Product (India) Pvt Ltd for industrial production, aseptic packaging in tetra paks, and marketing of Neera in Tetra packs.
- K-DISC will facilitate implementing the proof of concept of this project.

4) **Achievement in 2022-23**
- The project was presented before the World Bank workshop on Resilient Kerala Initiative on 14 December 2022.
- The draft business plan for pilot project has been prepared.

Innovation Tower

Due to the enhanced Operations of K-DISC and in order to accommodate a larger number of officials at K-DISC HQ, it has necessitated the need for refurbishing the office space of K-DISC at India Heights Building. The present office has been re-designed to accommodate more than 80 number staff over the five floors of the building in an open office model. Workshops and training sessions for the K-DISC staff as well as for the various programme stakeholders are planned to be conducted in the office itself as per the necessity and requirement.

K-DISC has reworked the office space to develop functional spaces, to ensure green protocol, Solar rooftop mechanism, good ambience and unique colour scheme, waste recycling and high-performance network management systems.

The building is equipped with the following installations:

1. Implementation of 48 V DC Solar Photo Voltaic System - to serve as a model energy efficient power distribution system and to integrate roof top solar energy system to existing grid (Behind the meter arrangement)
2. Water Curtain system – to reduce Solar heat gain
3. Vertical Axis Wind Turbine – to utilize the wind speeds in the roof top for generating electric power
4. Double glazed window – to reduce the heat transfer
5. Aero water system – producing water from the atmospheric vapour

This is the first public building in the state using 48 V DC for lighting and ventilation. Powered by a 20 KW roof top solar and a 1 KW vertical wind turbine, we also have a water curtain to reduce our air conditioning loads. We have activated a behind the meter grid charging facility in our premises. We also have double glazed window panels to reduce the air-conditioning loads and electronic controls. We are also showcasing some of our student innovations from the Young Innovators Programme (YIP) in the building premises. Each floor has been named after a key innovator and has a graffiti about their contributions to the society. These include Smt. Anna Mani, Shri. P.C. Mahalanobis, Shri. CV Raman, Shri. Gopalswamy Doraiswamy Naidu, Shri. JC Bose, Thomas Alva Edision, Marie Curie, Roselyn Franklin.

The building was recently awarded the Energy Conservation award in the building category by Energy Management Centre (EMC) on 14th December 2022, National Energy Conservation Day. In this context it is proposed to give the building the title 'Innovation Tower'. The building is envisioned to serve as a model for the state in behind the meter grid charging and adoption of DC power systems in building. It will also house an innovation corner for tinkering with innovative ideas and an innovation desk for submitting socially relevant problems that require innovative solutions.

Overall Outcomes

Parameter	Output
Planning, Competency Development and Innovation System	
Young Innovators Programme 2022 - Pre-registrations	48869
Young Innovators Programme 2022 - Ideator Registration	29340
Young Innovators Programme 2022 - VoS Pre Training Completion	24385
Young Innovators Programme 2022 - Total Groups Created	9595
Young Innovators Programme 2022 - Total Ideas Submitted	6447
Manchadi – active centres of implementation	23
Mazhavillu – centres of pilot implementation	5
ODOI – MSME Clusters part of the programme	63
ODOI – Mentor Institutions part of the programme	61
OLOI Training - LSGI heads	1757
OLOI Training - District-level implementing officers	495
OLOI Training - Resource Persons	1449
OLOI Training - Elected representatives	7760
OLOI Training - Block-level implementing officers	1632
OLOI Training - Grama Panchayath level implementing officers	7662
Multi Stakeholder Programme – Regular customers (approx.)	350
Multi Stakeholder Programme – Weekly transaction (approx.)	20,000
Local Innovation Programme Projects	8
Innovation Technologies	
Accelerating Adoption of Emerging Technology Solutions in Government – Total projects	33
Citizen Service – One Department One Idea 2021 – Projects	7
Innovation for Government (i4G) 2021 – Pilot Projects	4
Social Enterprises and Inclusion	
Innovation by Youth with Disability (YwD) – YwD provided continuous mentoring support	40
Talent Search for youth with Disability (YwD) – second batch strength	75
Miyawaki Afforestation Project for Rapid Forest Development and Climate Change Mitigation – Plots undergoing EIA	12
Kerala Knowledge Economy Mission (KKEM) Comprehensive Program for Employment of Educated Unemployed In Kerala (as on 30-01-2023)	
Total candidates registered on DWMS	12,99,866
Thozhil Sabhas conducted (approx.)	1300
Counselling – candidates benefited	27,479

Parameter	Output
Robotic Interview – candidates benefited	3355
Personality Development Training – candidates benefited	668
EnglishScore – candidates benefited	7999
Work Readiness Program – candidates benefited	4472
Total employers registered	3,521
Total vacancies created	4,10,365
Total vacancies currently available	30,351
Total Applications received	5,73,703
Total Applicants interviewed	31,761
Total Applicants shortlisted	21,796
Total Applicants hired	11,377
Applicants hired through ASAP	1,199
Applicants hired through Kudumbashree	4,799
Applicants hired through KASE	4,443
Applicants hired through Employment Exchange	9,860
Applicants hired through NORKA	566
Total Hired along with partner organisations	**32,235**

Awards and Recognitions

Digital India Awards

The Digital Workforce Management System (DWMS) won the Platinum Award under the category 'Digital Initiatives in Collaboration with Startups' in the prestigious Digital India Awards-2022'. The award was handed over by the Hon'ble President of India Smt. Droupadi Murmu to the Member Secretary K-DISC on 07th Jan 2023.

Kerala State Energy Conservation Award

K-DISC won the Kerala State Energy Conservation Award, instituted by the Energy Management Centre for Energy Conservation. K-DISC was given the award in recognition of its disciplined earnest attempts for energy use, conservation, research and increasing efficiency.

IEEE Award

K-DISC won the Global Sustainable Development Award of IEEE IAS Global Conference on Renewable Energy and Hydrogen Technologies (GlobConHT) 2023. It is an award previously won by National level institutions such as NITs and IITs. The award recognises institutions that contributed distinguishably in the areas of Emerging Technologies, related areas of Industry Applications Society to achieve Sustainable Development Goals for the world.

Tesz – Best Citizen Caring Government Department Award 2022

Tesz's Best Citizen Caring Government Department Awards celebrates and recognizes the efforts of government departments in answering citizens' queries. Top deartments are selected based on a number of factors such as the number of answers provided to citizen's queries, rating provided by the citizens for the answers, consistency in answering etc. Awards serve as a testament to the efforts of the departments and their commitment to serving the citizens of India.