

Grant-in-aid institution of
Kerala State Council for
Science, Technology and
Environment (KSCSTE)



ANNUAL REPORT

2020-21

IRTC
**Integrated Rural
Technology Centre**
Mundur, Palakkad, Kerala

ANNUAL REPORT 2020-2021



Integrated Rural Technology Centre

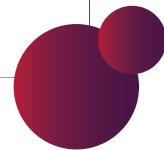
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Mission

- To adapt technologies known elsewhere into forms which will be readily acceptable to the society
- To diffuse innovative practices and technologies and to develop a scientific culture among the masses
- To work out local level development plans with a focus on the vulnerable population
- To take new technologies out of our R&D institutions for field trials
- To identify and promote local inventiveness
- To develop integrated S&T packages and management models for strengthening local economics
- To promote human resources and skill development
- To develop innovative methods and technologies in education and mass communication



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Director's Report

With the country and State hit by the pandemic vociferously, IRTC faced limitations for its routine operations, conducted brainstorming for new pathways and adapted ourselves for the changed times. As all the activities of the institute are field oriented, we were not able to travel, learn from the ground, as well as communicate with various stakeholders. Thus meaningful collaboration was interrupted. However, by rearranging our usual working pattern and by using virtual platform, our team tried to stay effectual in the pandemic period. We hosted webinars, online training programmes and collaborations with various institutions during this crucial period. There is no doubt that this method has limitations, but it has trained us to use the 'hybrid method', once the world goes back to normal. We do not claim that we have done everything that we had planned during the reporting time. But it is sure that our office staff and scientists took up the challenge.

In the reporting year we reconstituted Research Advisory Committee & Research Advisory Groups. Research proposals were reviewed and the progress of research works were assessed in the first meeting of RAC held in March 2021.

This year the major source of finance is grant-in-aid from Govt. of Kerala, Department of Biotechnology (Govt. of India), Department of Environment and Climate Change (Kerala), UNICEF, Department of Fisheries, K-DISC and NABARD. Grant in aid helped us to take up in-house R&D projects, infrastructure development and campus maintenance.

During the reporting period, three research projects got completed using the grant-in-aid support. Through experiments we could develop an effective rain water filtering system with filters made of activated charcoal made from coconut shell. An elevated model of septic tank was designed and established in IRTC campus as part of installation of flood resilient toilet linked multi feed biogas reactor. The potential bacteria

effective in biofloc production were isolated and got identified by molecular methods.

The entire amount allotted for infrastructure development was effectively utilized for developing Centre for Geo Informatics and strengthening Environmental Laboratory. Besides, we could establish an ultra-high-density aquaculture unit and install production tank and solar photo voltaic system.

We were also able to improve the amenities and facilities within the campus, which will be beneficial in improving the training programmes of different disciplines. As the campus is situated in a drought prone area, water security faces a severe threat during the summer season, and often training programmes are badly affected. This problem was solved to a great extent by adopting scientific rain water harvesting methods. Establishment of a conference hall and a recording studio is another notable achievement.

Presently, we have five action research projects and three consultancy projects. During this period, three project reports were submitted to funding agencies. KfW soil project supported by NABARD was started in eight watersheds of Palakkad District. As part of the project, soil conservation work, climate resilient farming, cultivation and popularization of microbial fertilizers like VAM and recharging of wells were completed. Other ongoing activities such as System of Rice Intensification (SRI) cultivation, pond valve system, nutrient garden, Miyawaki forest, biogas plants and issuance of soil health cards assisting farmers in using optimum fertilizers are progressing.

TDF project funded by NABARD at Urngattiri & Chaliyar panchayaths of Malappuram district is also under progress. One acre each of horticulture garden is being established in the lands of three hundred and three tribal beneficiaries and other

livelihood activities implemented for remaining one hundred families. Crops such as coffee, cashew and pepper are grown in the farms. NABARD-TDF project implemented by IRTC completed its five year long works at eight hamlets of Pudur grama panchayath in Attappadi, which was beneficial to 401 tribal families. A proposal for a sustainability plan for value addition and marketing of farm produce is under process.

The research study conducted by IRTC was successful in developing an effective methodology for composting in low temperature areas like Munnar. The centre developed a microbial consortium along with a poly house design to trap available day temperature in Munnar.

The project Biotech KISAN Hub, started with the support of DBT- DST, has been completed. The core activities of the hub helped local farmers in the project area to adopt scientific method of agriculture. As part of the project, we could establish Crop Residue Biomass Rapid Composting units making the farmers manage their crop residue more scientifically. A total of 250 units were allocated, benefiting farmers as custodian farmers. Compost acts as a soil conditioner creating conducive environment for microbial proliferation, help retain soil moisture and suppress plant diseases. It helps in avoiding crop residue burning that leads to air pollution also. Besides, growing black soldier fly larvae in the compost yard and using the larvae as live protein feed from waste for ducks, hen and fishes has been promoted in selected sites. The hub centre is also experimenting with random compost analysis using inoculum to get the enrichment .

A study is being carried out to understand the status of granite quarries in Thrissur, Palakkad and Kozhikode district with the support of Department of Environment and Climate Change, Govt. of Kerala. As part of the project several quarries have been identified which can

be restored effectively. IRTC has submitted a report on feasibility of municipal land fill site in Kasargode District.

IRTC is one among the five centres in the State selected by K-Disc for implementing the educational programme “Mazhavillu” (Teach science for Kerala). The programme is meant for integrated science learning using a learner centred, activity based, process – oriented pedagogy. A total of 50 students in the age group 8-12 in Mundur and Pudupariyaram gramapanchayaths are beneficiaries of this educational experiment. We have also started preparatory work to establish a children’s science activity centre in the campus.

In the year, a micro level natural resource level plan was prepared for two watersheds at Thiruvizhamkunnu farm of Kerala Veterinary and Animal Science University. IRTC is also extending services for the establishment of Palakuzhy small Hydel Project. During the reporting period 75% of the proposed activities have been completed. The Institution continues its consultancy service to Microbiology laboratory at Attappady centre of KILA.

The Natural Resource Management Division has initiated the preparation of watershed master plans for Ozhur and Thanalloorgramapanchayaths in Malappuram district.

Under the Social Science Division, a project report was submitted to UNICEF on exploring potential of local governments in improving quality of secondary education in Thrissur district, Kerala. The report portrays the interventions of district panchayath in secondary education and mapping the potentials of a district panchayath in transforming secondary education and formulating policy recommendation and process for a better planning exercise to improve secondary education quality through a State level initiative. Developed improved protocols and practice for planning and implementation in the domain of secondary education. On the basis

of the findings of this work, UNICEF proposed studies of this kind in all district panchayaths of Kerala.

Under Theeramythri project, IRTC facilitated the formation of 199 women Joint Liability Groups in Alappuzha and Kollam districts among the fishing communities with the assistance of SAF. The centre provided hand holding support for documentation, financial services at field level and interface management. The Project of 3R (Rebuilding, Revival and Reforms) package for ensuring accessibility of credit for fisherwomen in Kerala aims at building institutional systems which lead to the financial inclusion of fisherwomen and simplify the process of accessing the credit through bank linkage. This was a challenging task and we were able to make positive result in terms of near to full repayment of their loan.

As part of the Theeramythri project, IRTC facilitated the signing of an MoU with Ashtamudi project for the mass production of garments. Also facilitated Opportunity Guidance, Achievement Motivation Training and Management Training for the newly identified micro enterprises. An initiative was taken up to implement new measures to help and hand-hold the micro enterprises to overcome the Covid 19 pandemic and natural calamities.

Under the Solid Waste Management Division, innovative research programmes have been carried out. The microbial combination containing actinomycetes, bacteria and fungi showed high efficiency in composting chicken and other bio wastes without any foul smell or leachate, which is due to the addition of necessary coir pith as well. It is found that the composting takes only 25-30 days for completion. Further, as the pith also gets degraded, the nutrients in the coir pith gets added to the compost - it is nutrient rich. The centre also carried out research in enzymatic activity of consortium's bacterial isolates. Besides, inocula were prepared and bulk cultures were obtained for application studies and stored aseptically in sterile cans. This microbial consortium was further used at Kunnamkulam plant as a pilot

study to bio-convert 10 tons organic wastes. The Centre also examined the shelf-life of gypsum-based inoculum and rice water as possible growth medium for bacteria, actinomycetes and fungi. An experiment to produce biogas from lignocellulose biomass is under way.

The Livelihood Division has initiated RAS aquaponics with MBBR system under "Blue Revolution Scheme" of the Department of Fisheries, Kerala. The centre provides training in Aquaponics and Biofloc fish cultivation. During the reporting period, Pottery and Decoupage unit has designed new ornaments, red clay cups clay ball for indoor flower pots. Under the NABARD scheme, the fisheries division has initiated popularisation of Biofloc fish cultivation in Palakkad district. A project report was submitted to KSCSTE on Value- Added Products from Jackfruit, Mango and Papaya. The study of glycaemic potency of various food items is of great significance as it helps to maintain good health.

The environment laboratory has been upgraded in terms of infrastructure facilities, analytical capabilities and interpretation. Its capacity to test soil, water, plant, compost and lime quality has been upgraded. The website of IRTC was revamped and the infrastructure and equipment facilities were up scaled for documentation works and audio-visual production. The Documentation and Publication Cell at IRTC compiled a monograph on watershed, produced around 20 short and long videos and disseminated newsletters regularly apart from routine work.

During 2020 -21, the Haritha Sahaya Sthapanam (HSS) of IRTC undertook various activities including providing technical support to local government institutions for their waste management. This year, 66 local bodies have signed agreements with IRTC. In addition, we were entrusted with the waste management of seven local bodies by UNDP. At various stages, training were imparted to different stake

holders. An extensive campaign was planned to convince the public of the need for scientific and comprehensive waste management. The most arduous task was to ensure door-to-door collection in all homes and establishments. Precise monitoring was also ensured in this regard. The activities of HSS are extended to 1165 wards in 63 LSGDs. HSS has done exemplary work at ground level to perpetuate the concept of decentralised waste management and became instrumental in guiding the waste management practise at ward level.

Project Implementation Unit and Parishad Production Centre- two sister concerns of IRTC extended their support for the implementation of various projects. PIU focus on finding friendly solution to waste management issues within the State and execute various action plans for LSGDs and other government agencies in a pre determined period. PIU has also placed its footsteps in the area of waste water treatment and has undertaken the construction and maintenance of five sewage treatment plants with 80-100 KLD capacities. During this financial year PIU had an opportunity to complete 164 engineering projects and 263 non-engineering projects. Parishad Production Centre assisted in providing background support for the implementation of the projects in a faultless manner.

This year showed a sharp decline in number of training programmes and intake for internships/

student projects compared to earlier times. A total of 55 students completed internship, 58 student did their projects and 645 people got trained in various disciplines. Four webinars have been organised and our faculty has been resource person for several webinars, orientation programmes and popular talks. E-learning programmes in the area of energy audit in association with Energy Management Centre, Kerala has also been planned.

Many young researchers have joined our institution this year, and I appeal, as always, to the younger generation to come forward with innovative ideas for shaping our future and concrete suggestions for the Institution.

IRTC records its grateful thanks to the KSCSTE for their yearly annual support to our activities. The current growth and development of IRTC is solely due to the committed team effort of the faculty and staff members and project fellows under the guidance and support of senior faculty and RAC members.

I would like to thank the Chairman, Registrar, Director of Research and Executive members of IRTC for their contribution towards the functioning of the Institute.

Prof. (Dr.) J. Sundaresan Pillai
Director, IRTC

Financial Report

Despite all activities adversely affected by the pandemic, IRTC continued its financial activities and managed to revive its financial position during the financial year 2020-21.

In contrast to the previous year, the grant-in-aid support from the Government of Kerala under plan and non-plan heads assisted IRTC to a great extend to carry out research activities as well as institutional maintenance. Due to the additional burden caused by the pandemic situation, there is a partial increase in the administrative overheads compared to last year. Over a period of last few years, the major source of income for meeting the administrative overheads of IRTC was income from training activities, which showed a negligible amount of 1.19 lakhs this year (Rs. 52.06 lakhs in 2019-20 and Rs. 83.07 in 2018-19).

Amid all the unfavourable circumstances prevailed due to Covid-19, IRTC managed to fully utilize the funds received under plan and non-plan grants from the government within the stipulated period with the support of our implementation unit and vibrant staff members. The non-plan assistance along with the support from IRTC sister concerns contributed to

the renovation and facelift of IRTC is worth mentioning.

The major sources of project income are listed below:

Projects	Amount (in Lakhs)
DOECC- Mapping of quarries	18.19
DST- Biotech-KISAN Hub	19.47
NABARD Project (TDF, Biofloc, KfW Soil Project)	35.89
UNICEF	6.85
UNDP- HRML Project	5.40
State Planning Board (MRS)	5.87

Income generated under various sources coming under the head "Annual Maintenance and Consultancy" showed a comparative hike this year. The IRTC-Harithasahaya Sthapanam(HSS) continued to be the major contribution towards this. Theeramythri, UNDP and PSHC are the other major sources.

The income tax department has approved IRTC to receive donations under section 80G and an amount of Rs. 5,32,500 has been collected as donations during this year.

The production units at IRTC could not attain stand alone targets, mainly due to limitations caused by pandemic situation. Mushroom Unit is an exception and earned a considerable margin this

year. The other segments viz. Fisheries, food, SWM and pottery are expected to move in this direction in the coming year.

The excess of income over expenditure showed a satisfactory figure of Rs. 9.35 lakhs compared to last year's minus 14.1 lakhs.

We are thankful to the audit team led by T.K. Muraleedharan, Chartered Accountant of M/S Ranjit Karthikeyan Associates for the proper audit and preparation of the financial statements.

Sri. P.K. Narayan and P. Ramesh Kumar conducted the internal audit. The audit report along with the compliance is submitted before the general body meeting for discussion and approval.

Grant-in-Aid Support

KSCSTE, Govt. of Kerala



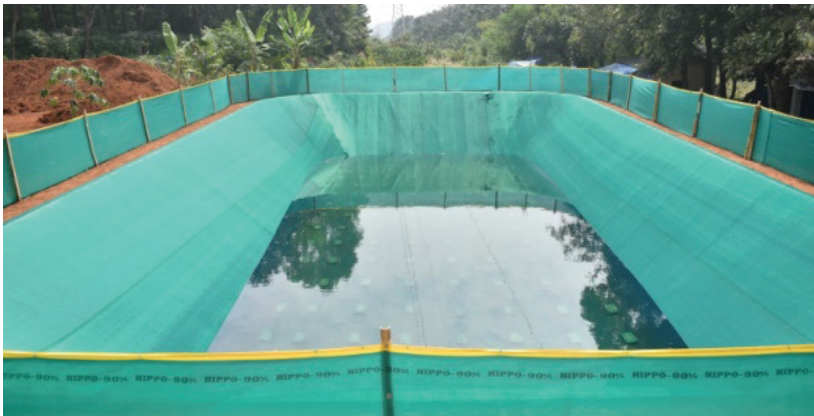
A. Research and Development Activities

I) Roof Top Rainwater Harvesting System

The filter units for Rain Water Harvesting Structures found differences in, absorption and sedimentation of particles in the water collected based on characteristics of the building terrace. In order to overcome this hurdles, new models were designed fabricated and tested; trials were conducted with larger and smaller filter cabins using different types of

charcoals. We used different aperture size of filters with different layers in size; a large number of trials were run in IRTC campus to optimize the size of the filter. The trials with activated charcoal made from coconut shell found to have larger porous areas and is found to yield more clear water. The filter cabinet length, size and partitions

were well designed to remove the charcoal and to replace with fresh charcoal in the cabinet. The gravels used in layers in the filter cabinet can also be taken out washed and replaced. All the water quality parameters were analyzed in the IRTC laboratory and the methodology used found successful.



Rainwater harvesting pond with capacity of 7 lakhs litre- Water from filters of various roof top are collected here

II) Installation of Flood resilient toilet linked multi feed biogas reactor with advanced over flow water treatment facilities

The prime objective under this effort is to critically analyse and understand these technologies for techno-economic viability, consumer and market acceptability and sustainability. The first stage of construction has been undertaken. Because of general election campaign the remaining works have been interrupted and to be completed soon. An elevated model of safety tank designed and established in IRTC for testing purpose.



| Fabrication of elevated toilet



| Probiotic production

III) Development of potential microbial consortia as probiotics for biofloc production:

Two potential bacteria effective in biofloc production were isolated and identified by molecular methods. These microbes further have to be developed into effective probiotics.

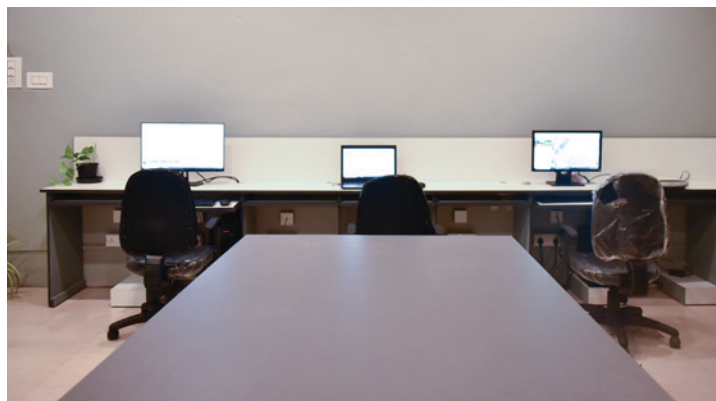


B. Infrastructure Development

I) Strengthening Centre for Geo Informatics

It was considered as a major S&T input in IRTC's activities in the area of Panchayath resource maps and watershed-based master plans as this helped to speed up the process and improve the quality of work. Centre for Geo-informatics developed expertise in free GIS software like GRASS, Quantum GIS, and also expertise in Web GIS and RDBMS.

In addition to the project works, the centre implemented various training programmes



| Centre of Geoinformatics

in fundamentals of GIS and remote sensing, and also acted as a centre for carrying out the project works for students within and outside

Kerala. Training programmes were conducted for students, researchers and professionals.



II) Strengthening of IRTC laboratory

Both water quality testing and soil nutrient testing is carried out in the environmental laboratory. Procured instruments include Balanced Cell Colorimeter, UV visible spectrophotometer, glass

| Water quality analysis laboratory

distillation unit (Quartz), Turbidity meter for the purpose of analysis.

Molecular Microbiology studies related instruments were procured including Polymerase chain reaction machine (PCR thermal cycler, Biorad) and Electrophoretic unit. Rotary shaker and other related glassware were procured for mass production of microbial consortia.



| Experiment using in Laminar Air Flow

III) Ultra high-density aquaculture, Construction of production tank and installation of Solar Photo Voltaic system

Errected a 5 KV roof top solar system to ensure uninterrupted power supply to the currently live recirculating aquaponics and biofloc systems. In aquaponics the power requirements are for pumping amonia-rich fish excreta to the biofilter units and in biofloc power requirement is for aeration only.



| Fish harvesting from biofloc tank

Activities undertaken under Non-Plan Grant (2020-21)

1. The ponds were renovated to provide water facility for aquaculture unit. This will ensure water supply 365 days for high density fish farming and training requirements.
2. Modification of Training yard under Centre of Excellence in Waste Management
3. Upgrading Centre for Geoinformatics – IRTC
4. R & D in Effective Microbial identification, Analysis, Development of multi-microbial consortia for waste management, soil fertility and pro-biotics
5. Strengthening existing environment laboratory with additional equipment
6. Procurement of books in the R & D section of library
7. Hi-tech Mushroom cultivation Unit
8. Additional Facilities for Faculty, Conference Room and recording room.



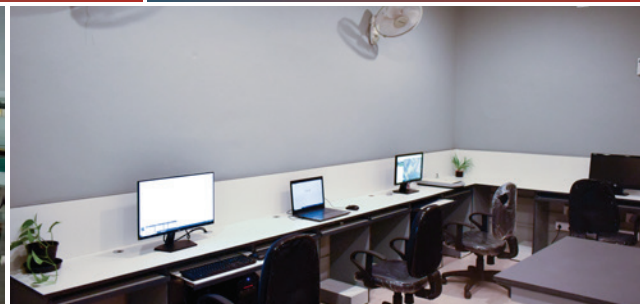
IRTC Conference Hall



Need caption



Peoples Science Library in IRTC



IRTC Conference Hall



Renovated pond (capacity of ... Lakh)



Emporium setup in pottery division



Mess hall



IRTC Garden

Action Research



KfW Soil Project

This is a climate adaptation project implemented in the eight watersheds of Palakkad district such as Muttichira-Nadupathy, Pazhaniyarpalayam, Ancham mile, Pullundassery, Konnakkalkkadavu, Poothanakkayam, Chazhiattiri and Nagalassery coming in the different agro climatic units. The project was started in 2019 and the project period is up to December 2022. First three instalments of funds were received from NABARD for this project. Of INR 449 lakhs- INR 262.5 lakhs have been released

Principal Coordinator

R. Satheesh

Team Members

Sabu P.S., Sophy K. Antony, Vaishak P.N., Shibu P., Pranav S., Rahul K.

Funding Agency

NABARD

Project Outlay

INR 541.958 Lakh

and INR182.36 lakhs has been expended. The following table gives the details of the fund utilised and the important activities implemented.



Rainwater filter unit training and installation at Ancham Mile Watershed



Pond setup for aquaculture as part of the project

Sl. No.	Name of the watershed	Grama Panchayath	Fund utilised (Lakh)	Important activities implemented
1	Nadupathy – Muttuchira (1008 Ha)	Pattancheri	14.62	1) Step valve system for the irrigation ponds 2) Soil Health Card (SHC) 3) Nutrition Garden 4) Fruit forest
2	Pazhaniyarpalayam (759 Ha)	Eruthempathy	23.36	1) Kokarny (well) desiltation 2) VAM cultivation 3) Azola 4) Inter cropping with spices and banana
3	Ancham mile (838 Ha)	Kozhinjampara	28.14	1) Well de-siltation 2) Inter cropping (turmeric and ginger) 3) In situ organic manure cultivation
4	Pullundasseri (679)	Kadampazhi ppuram	24.03	1) percolation pit in rubber plantation 2) Silk Pauline Tanks 3) Earthen Contour Bunts 4) Bio compost bins
5	Konnakkal Kadavu (896 Ha)	Kizhakkanchery	23.83	1) Stone pitched bunds 2) Miyawaki fruit forest 3) Biogas plant 4) well recharging
6	Poothanakkayam (580 Ha)	Kizhakkanchery	20.54	1) Recirculatory Aquaculture 2) Soil Health Card 3) Kitchen garden 4) Miyawaki fruit forest
7	Chazhiattiri (947 Ha)	Nagalassery & Thirumittakkode	24.6	1) Climate resilient farming, Bio gas, Fruit Forest
8	Nagalassery (827 Ha)	Nagalassery & Thirumittakkode	27.94	1) Climate resilient farming, Bio gas, Fruit Forest
	Total		182.36	

NABARD TDF Project Chaliyar and Urangattiri Gram Panchayats

Malappuram District

TDF project Chaliyar and Urangattiri is implemented for the development of 403 tribal families residing in the hamlets Kandilampara, Nayadampoyil, Vennekkode, Palakkayam, Panapoyil, Paingod, Pathemcolony, Kunathode in Chaliyar GP and Nelliya Kunnu, Kodampuzha, Enthampali, Alaggars,

Chokkunnu, Vendakkumpoyil, Mayiladi and Parimala in Urangattiri GP. As part of the project, it is envisaged to develop horticulture garden of 1 acre each in the lands of 303 tribal beneficiaries and a garden of 0.66 acre each in the land of 20 tribal beneficiaries. This will eventually provide

Principal Coordinator

R. Satheesh

Team Members

Sabumon P.S., Sophy K. Antony, Vaisakh P.N., Pranav S., Chithra

Funding Agency

NABARD

Project Outlay

INR 373.46 lakhs

a sustainable livelihood and income. The crops grown are coffee, cashew and pepper. Of the project outlay of Rs.373 lakhs, NABARD grant is 259 lakhs and the beneficiary contribution is 85.88 lakhs. In addition to this an amount of Rs. 28.16 lakhs are in convergence with MGNREGS.

During the first year of the project period 4568 cashew saplings, 21749 coffee saplings and 31360 pepper saplings were planted in the land of 166 beneficiaries. Beneficiary committees were formed in each hamlet. Through the tribal agriculture nursery "Navajyothi" planting materials of coffee and pepper produced. The compost required for the farmers is prepared by the tribal JLG 'Green Earth' formed at Oadakkayam in Urangattiri GP. The second phase of funds is received from NABARD and the planting operation of the remaining wadis is progressing well.



Irrigation tank constructed in Chaliyar Grama Panchayath



Project beneficiaries at work

NABARD TDF Project Attappady

The tribal development project implemented in the eight hamlets of Pudur GP in Attappady Block with 401 tribal beneficiaries got completed on 31 December 2020. The project completion report was submitted to NABARD. The sustainability plan for this project has been submitted to NABARD for funding and it is under the consideration of NABARD Head Office. The sustainability plan is envisaged to be implement

through the registered tribal farmer's society "Aranya" floated under the TDF Project.

Principal Coordinator

R. Satheesh

Team Members

Sabu Mon P.S., Shanish V.N., Vaishak P.N.
Sophy K. Antony, Shibu P., Pranav S.

Funding Agency

NABARD

Project Outlay

INR 171.72 lakhs



Nilai Tribal women nursery at Attappady as part of the project

Action research-based study on developing a solid waste management system in Munnar

Munnar having a different climatic condition compared to the plains, a different microbial consortium had to be developed to work on the area of organic waste management. Local exotic soil and decayed debris was screened for local psychrophilic and effective microorganisms, and a consortium was developed at IRTC.

Outcome: The microbial consortium developed at IRTC along with a polyhouse design to trap available day temperature in Munnar, an experiment was conducted to do effective composting at Munnar. The results

showed that composting process was effective and fast in the winter climate during December-January there. The entire composting process took 28 days to complete.

Funded by

UNDP

Principal Coordinator

Dr. P.N. Damodaran

Funding Agency

UNDP

Project Outlay

INR 6.136 lakhs



Experimental unit at Munnar

Establishment of Biotech- Krishi Innovation Science Application Network (KISAN) Hub at IRTC- Crop Residue Biomass Rapid Composting Demonstration Units

The objective of the project is to establish Crop Residue Biomass Rapid Composting units making the farmers practice for managing their crop residue to a valuable product facilitating through DBT, Biotech- KISAN Hub at IRTC. Farmers in the Palakkad district cultivate heterogeneous varieties of crops and follow a broad pattern of farming practices. The farmers are selected on the basis of willingness to keep the units operational for an adequate period of time and permit project team at any time to conduct experiments in the demonstration units. The project was sanctioned for two years and a further six months extension was provided. The extension was without any additional financial implication within the overall sanctioned

budget provision to complete the envisaged activities. Including both the years, a total of 250 units are allocated benefiting farmers as custodian farmers. Significance of crop residue management is utilizing the potential of compost as a soil conditioner creating conducive environment enriching soil, helping retain moisture and suppressing plant diseases and avoiding crop residue burning.

The benefits also include increasing soil organic matter, storing carbon, regulating water, reduces the need for chemical fertilizers. The year II started with the intervention of using Effective Microorganism(EM) for rapid

Principal Coordinator

Prof. B.M. Mustafa

Team Members

Dr. Haneesh Mohammed C.H., Sreeraj P. Surya Sethumadhavan

Funding Agency

Department of Biotechnology

Project Outlay

INR 58.48 lakh (for year II - 28.49 lakh)

Unit Advantages

It can be used for

- Windrow composting
- Cow dung-based composting
- EM Composting
- Vermicomposting
- Chicken waste composting MB
- Material – Fiber reinforced cement board (Asbestose free, less water soaking, fire resistant, termite isolated)
- Hybrid system
- Easy transport,
- Easy installation,
- Less maintenance,
- Economical



| Trial and experiment unit at IRTC

composting of agriculture crop residue biomass. The main hurdle while using available EM inoculum was the ineffectiveness of decomposition of lignocellulosic biomass present in some of the crops cultivated in this region. An EM inoculum for decomposing the same is under investigation at IRTC. A prototype for crop



Crop residue biomass rapid composting unit established at Vilayodi

residue shredding device is under development at IRTC for an easier and faster decomposition.

In the second year, farmers were identified from 15 different clusters of Palakkad district. A total of 40 new units were installed at custodians' premises, remaining 85 units, fabrication materials like cement fiber boards and iron angles are trimmed for easy assembly and installation and was then distributed to the custodians' premises; its fabrication and erection are in progress. We have given training to all the farmers to use biotechnology tools like inoculum for rapid composting. All most all the family members of the farmers were trained at their residence and online training and guidance were also given. Farmers used EM for crop residue decomposition and produced biocompost within 30-45

days leaping the conventional method of more than 90 days. Some of the farmers have followed the correct composting methodology and turned as master trainers. Most of the farmers followed our guidance and harvested compost with good quality which has analyzed at our lab and proved. 80% of the farmers have the combination of crop residue but others having residues like plantain parts, areca nut husk, and cocoa shell. A few farmers started growing Black soldier fly larvae in the compost yard and using the larvae as live protein feed from waste for ducks, hen and fishes. We assisted 20 mushroom cultivators for composting their spent mushroom beds. More than 25 farmers are doing vermi-composting using fabricated cabin after some minor modification. During the six months extended period, the hub centre decided to do

more experiments in random compost analysis using inoculum to get the enrichment and find its methodology, educating the enriching methodology to farmers and train them with the proper usage of the compost in the cultivation especially in vegetable farming.



| Composting of dry leaves

Mapping Spatial Distribution of Quarries in Thrissur, Palakkad and Kozhikode Districts

The Centre is currently involved with the 'Mapping spatial distribution of quarries in Thrissur, Palakkad and Kozhikode districts', a project funded by the Directorate of Environment and Climate Change, Kerala and was sanctioned on 3rd July 2020. The duration of the project is one year. The P.I. of the project is Dr. S. Sreekumar, Director of IRTC and the Co- P.I. is Anand Sebastian. The total fund for the project sanctioned is 31.37 lakhs. It will help to create a data base on the number of rock quarries and area of quarries in the study region. The study aims to develop strategies for environmental restoration/management plan for non-working/abandoned quarries.

Field staffs were appointed for the project for a period of two months. Two persons in Palakkad district, four persons in Thrissur and Kozhikode districts carried out field survey. Field survey orientation was given to the staffs prior to the survey.

Principal Coordinator

Dr. S. Sreekumar

Team Members

Anand Sebastian, Rajan M. Vivek Asokan, Haritha S.

Funding Agency

DoECC

Project Outlay

INR 31,37,200 lakhs



| Field survey orientation



| Active quarry site



| Field surveying

Mazhavillu

Teach Science for Kerala is a sequel to Manchadi

K-DISC has designed and implemented Teach Maths for Kerala-Manchadi programme based on realistic maths education and Vygotskian approach to improve children's proficiency in mathematics. On assessment of the first-year activities, it was found that the mathematical ability of the children participated in the activities of 'Manchadi Koodaram' was better than that of the others who have not participated in the project. K-DISC is trying to extend the experiments towards science teaching and has now launched 'Mazhavillu' for integrated science learning using a learner centred, activity based, process-oriented pedagogy.

Integrated Rural Technology Centre - Mundur is one among the five thematic centres in the State and would attempt

developing the concepts for the themes such as Agriculture, Environment and Allied Sectors; and Kerala Political Socio-economic Cultural Contexts through the pilot experiments.

A total of select 50 students in the age group 8-12 in the vicinity of the institution are sought to be engaged in the educational experiment. They

would assemble in a dedicated classroom/laboratory/ workplace in the institutions and in community spaces in the locality for engagement with the academic community. The local bodies of Mundur and Puthuppariyaram will also take part in the project and five volunteers from the panchayats were also selected for running the project.

K-DISC has approved a proposal submitted by IRTC under local innovation promotion for the production of microbial consortium in bulk. A coir pith defibering unit is also part of the project.

A production yard, lab and equipment like fermenter, steam generator, autoclave, etc. are the requirements. K-DISC has sanctioned 19.8 Lakh for this project.



Palakkad District Panchayat President Binumol inaugurating the district level activities of Mazhavillu project

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

- Bringing in an element of history of science in science teaching.
- Imbibing scientific temper and spirit of enquiry in children.
- Developing critical thinking and analytical abilities in children
- Demonstrating the method of science through experimentation and through open ended problem solving for innovation and exploration.
- Application of the method of science to human problems and problems at the society-nature interface and society- science interface.

Consultancy Projects

The 3R (Rebuilding, Revival and Reforms)

Pilot project and JLG Projects

(Department of Fisheries)

Integrated Rural Technology Centre has been providing managerial and field level support to implement 3R (Rebuilding, Revival and Reforms) pilot project and JLG (JLG Project for Ensuring low interest credit accessibility) project. IRTC has been taken initiative to develop a system for JLG formation, documentation, financial services, to provide hand holding support at field level and interface management. The Project of 3R package for ensuring accessibility of credit for fisherwomen in Kerala, aims at building institutional systems which lead to the financial inclusion of fisherwomen and simplify the process of accessing the credit through bank linkage. In the pilot project, SAF has already provided working capital assistance to 995 working fisherwomen across Kerala and prevent the exploitations of private money lenders. It has been implemented by forming 199 women JLGs (Joint Liability Groups 4- 10 members) in fisheries sector who are involved in fish vending, fish drying and curing, peeling and processing and other allied activities. The project has been initially

implemented among the fishing communities across Kollam and Alappuzha districts. The total project cost amounts to Rs. 178.00 Lakhs. To extend the support in this regard, we have received application to provide second phase credit linked working capital assistance with fifty percentage increased amount to the same members who have completed their repayment successfully.

Consultant

A.K. Mathew

Project Coordinator

Shihabudheen P.

Regional Coordinator

Nikhil Mohan

Project Outlay

INR 8,00,000

Funding Agency

Society for Assistance to Fisherwomen (SAF)



| Training conducted as part of 3R Package Project

JLG Project

The JLG project is formulated on the basis of the successful implementation of 3R project phase I in the Kollam and Alappuzha districts. Through managerial and field level coordination support to JLG project, IRTC provides hand holding support in project proposal making, ensuring

financial support from NABARD, collaboration with Kerala Gramin Bank and selection of beneficiaries and facilitators. The fishing community in the state has relatively less access to banking services. Therefore, the project is implemented to save fisherwomen from the clutches of money lenders by grouping the women into

JLGs and assist them through credit linked working capital. During the 20-21 financial year 1,520 working fisherwomen across four districts in Kerala benefited from sustainable credit linked working capital revolving scheme which covers and prevent the exploitations of private money lenders. It has been implemented by forming 304 women JLGs

(Joint Liability Groups of five members each) in fishery sector who are involved in fish vending or peeling activities. The project has been implemented among the fishing communities across Thiruvananthapuram, Kollam, and Alappuzha and Ernakulam districts. The total project cost amounts to Rs. 239.00 Lakhs.

Due to the ongoing pandemic conditions and existing restrictions many training programs and field level programs to increase the capacity and financial discipline of SHG members has not been conducted last year, however the 3R and JLG pilot project could establish suitable mechanism for institutional credit by the support of IRTC.



Theeramythri Project

Xth Phase



IRTC has been giving managerial and field level support in the implementation of Theeramythri Project since phase-I i.e., for the last 11 years. During the current year, IRTC facilitated the signing of an MoU by Ashtamudi project for the mass production of garments. IRTC supported SAF Activity Groups' Apex federation in the procurement and distribution of garments materials. IRTC also facilitated

Opportunity Guidance, Achievement Motivation Training and Management Training for the newly identified Microenterprises.

The year 2020-21 has seen a lot of setbacks for the micro-enterprise units under Theeramythri project due to COVID-19 pandemic and its adverse effects in market. Many units in coastal region were also seriously affected due to floods. Most of the

Project Coordinator

Amal Mohan, Shino Davies

Regional Coordinators

Nikhil Sudheesh, Jayaprakash P. Sindhu Kishore

Consultant

A. K. Mathew

Project Outlay

INR 20,00,000

Funding Agency

Society for Assistance to Fisherwomen (SAF)

unit are barely functioning and many units which were functioning impressively have got badly affected due to market condition and lockdowns. The sales turnover by micro-enterprises of year 2020-21 has not been fully calculated due to this looming uncertainty. IRTC along with SAF has been planning to implement new measures to help and hand-

hold the micro enterprises to overcome the situation and to cope-up with the new reality. The mission coordinators have been requested to identify struggling units and prepare micro-plan for them to function and generate income by understanding the current market scenarios.

Apart being regular participants of State, District and TMC-level meetings, IRTC have been supporting SAF by extensive and regular field visit and thus

ensuring the strict monitoring of the project. In the year 2020-21, 10 new activity groups were identified to establish micro enterprise units in 10 districts. IRTC coordinators

conducted a feasibility study of 85 units and submitted the report to Executive Director, SAF.

In addition, the following project proposals/concept notes were prepared for SAF.

- Theeramythri project proposal 2021-22
- JLG project proposal 2021-2022
- Seafood restaurant proposal
- Revival package proposal for 400 micro-units which are affected by COVID-19

Palakkuzhy Small Hydel Project

After Meenvallo Small Hydel Project, IRTC is providing technical support for the implementation of Palakkuzhy Small Hydel Project and the works are under progress.

Palakkuzhy Civil works: The civil work at weir site has been resumed in September

2020. The construction of the weir is completed up to 80 %. The construction of Ogee portion at spillway and Intake portion are to be done. The construction of the bridge above the weir is completed up to 70 %. Only three spans for a length of 21 metre are to be

Funding Agency

District Panchayath Palakkad

constructed. The construction of all the piers with piercaps is completed.

E & M works: KEL informed PSHC that they cannot



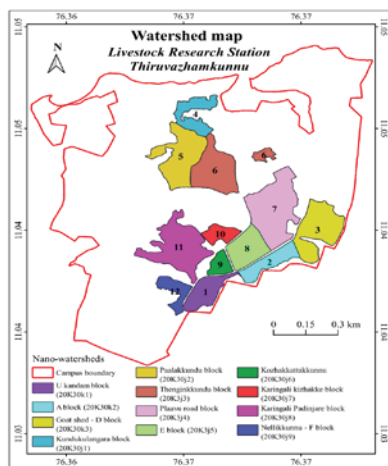
proceed with the project due to the collapsed economy on account of Covid 19 pandemic. The Board meeting held on 31.07.2020 decided to cancel the Letter of Acceptance, since

KEL could not submit the agreement. PSHC re-tendered the E & M works and being the lowest bidder, Fitwell Power Projects Private Limited, Vadodara, Gujarat executed

the agreement on 12.03.2021. The machine drawings and the layout drawing of the machines at the powerhouse are received from Fitwell Power Projects.

Master Plan Preparation for KVASU

The first phase of 'Preparation of master plan for developing Silent Valley Platform of Kerala Veterinary and Animal Sciences University (KVASU) based on micro-watershed approach, Live Stock Research Station at Thiruvazhamkunnu' is successfully completed during the current year. The amount credited for the first phase was 1.02 lakhs. After submitting the report on first phase to the clients, a second phase is executed based on their needs. Micro level natural



Principal Coordinator

R. Satheesh

Team Members

Rajan M., Vivek Asokan

Funding Agency

KVASU

Project Outlay

INR 1,02,000.00 lakhs

resource development plan was prepared for two new watersheds at Thiruvizhamkunnu farm as part of this.

KILA Lab at Attappady

IRTC provides consultation services for the Microbiology laboratory of KILA at Attappady. Including its establishment, formal functioning and providing adequate trainings and monitoring, IRTC is in a process to establish a well-maintained laboratory that caters to the need of public at Attappady. During 20-21,



Project Consultant

Prof. P.K. Raveendran

five-days training for soil testing were provided to the laboratory staff at IRTC Soil Testing Laboratory. Currently, works including research and production of biofertilizers, soil analysis and water testing are being carried out in the laboratory.

IRTC Divisions

Natural Resource Management

The Natural Resource Management Division of IRTC is implementing projects like NABARD- KfW Soil Project, NABARD Tribal Development Fund Project and other related projects associated with climate adaptation, watershed management and eco system restoration.

Training and capacity building programmes

Due to Covid -19 pandemic it was not possible to conduct all the envisaged training programmes and exposure visits. However, training was imparted to volunteers at each watershed for the scientific collection of soil samples. After the distributor of soil health card,

training was imparted to farmers in each watershed about the usage of Soil Health Card in determining the fertiliser requirement of each farmer.



Renovation of *Kokkarni* (Deep pond)

Covid Relief Activities

All the Village Watershed Committees conducted covid resistance campaigns in their watershed areas. They provided PPE kits, sanitisers and masks to the first line treatment centres.

Head of the Division

R. Satheesh

Team Members

Sabu P.S., Sophy K. Antony, Praveen K.V.
Vaishak P.N., Rahul K., Shibu P.
Pranav S., Nikhil K.V.



Plant distribution programme of Poothanakkayam VWC under KfW Soil project

Watershed master plan for Ozhur and Thanaloor GPs

Watershed masterplan preparation work of the two GPs Ozhur and Thanaloor in Malappuram district will be conducted once the prevailing condition of Covid 19 improves.





Centre for Geoinformatics

The Centre for Geoinformatics is the youngest centre at IRTC set up with the support of Kerala State Council for Science, Technology and

Environment. The Centre was inaugurated by A. Nizamudeen, Director of KSREC on 25th August 2020.

Team

Anand Sebastian, Rajan M. Vivek Asokan, Haritha S.

Table 1: Details of projects at Centre for Geoinformatics

Sl. No.	Project name	P.I.	Project cost	Project period	Status
1.	DoECC - Mapping spatial distribution of quarries in Thrissur, Palakkad and Kozhikode districts	Dr. S. Sreekumar	31,37,200.00	1 year	Ongoing
2.	Preparation of master plan for developing Silent Valley Platform of Kerala Veterinary and Animal Sciences University (KVASU) based on micro-watershed approach, Live Stock Research Station at Thiruvazhamkunnu Phase I Phase II	-	1,02,000.00	-	Completed Sanctioned
3.	Geo-innovation challenge of spatial capacity building scheme of DST-NGP	Mr. Anand Sebastian	3,00,000.00	3 days	Sanctioned



PG Dissertations and Trainings

GIS and remote sensing hands-on training 2020-'21

Trainings constitute one of the foremost activities carried out by the Centre. The major objective of the training includes the transfer of technology to the professionals and students through hands-on sessions. The centre has successfully completed eight batches of 'Hands-on Trainings on Fundamentals

in GIS and Remote Sensing'. The trainings were completed for Government staffs like agricultural and LSGD officers, etc. Despite of Covid-19, during 2020-'21 period, training of two batches were successfully completed. First batch training was carried out from 21st to 23rd December, 2020 and the second batch was from 1st to 4th March, 2021.

Internship and consultancies

The centre provided consultancies for professionals and facility for internship and dissertation for students. A total of six engineering and Ph.D. consultancies were completed this year.

Internships for twelve B.Tech. Agricultural Engineering students from Dhanalakshmi Srinivasan Institute of Research and Technology (DSIRT), Siruvachur, Tamil Nadu was carried out from 28/12/2020 to 08/01/2021 at the Centre. The details of trainings are given in Table 2.

M.Sc. Dissertations

Five students joined for their dissertation work in the month of January, 2021 as a part of their M.Sc. course.



| Hands on training programme

Solid Waste Management

The major targeted works in Solid waste management division is on the development of potential microbial consortia for biodegradation / composting of organic wastes and liquid wastes.

Principal Coordinator

Dr. P.N. Damodaran

Team Members

Dr. Vinaya K., Dr. Thazeem B.,
Dr. Veena George, Chithrajith Babu,
Chikku Marin John

Major Projects

Completed – final report to be submitted: Funded by-UNDP

1. Action research-based study on developing a solid waste management system in Munnar **Ongoing: Funded by UNDP**

1. Implementation of comprehensive waste management and extensive IEC activities in the selected Grama Panchayats - Munnar, Devikulam & Vattavada (Idukki District)
2. Implementation of comprehensive waste management and extensive IEC activities in the selected Grama Panchayats in the Project Landscape- Mankulam, Adimali & Chinnakanal (Idukki District)
3. Implementation of comprehensive waste management and extensive IEC activities in the selected Grama Panchayats in Athirappilly Grama Panchayath (Thrissur District)

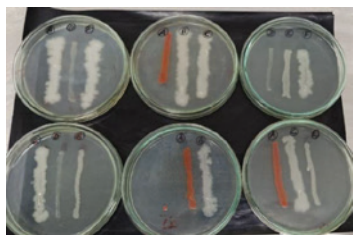
In-house Projects

1. Development of potential microbial consortium for organic waste management

Methodology: Samples were collected from exotic locations such as untouched forest and microbially rich soil areas, composted piles etc. The microorganisms were further isolated by serial dilution method. Axenic cultures

were made by re-streaking them on Nutrient Agar plates based on their morphology. These cultures including actinomycetes, bacteria and fungi were further tested in organic wastes including chicken and vegetable wastes for their composting efficiency. Heaps of biowastes were tested at Puthuppariyaram compost yard and bio-bin tests were done at IRTC campus.

Outcome: The microbial combination containing actinomycetes, bacteria and fungi showed high efficiency in composting chicken and other biowastes without any foul smell or leachate, which



Field trials of consortium



is due to the addition of necessary coir pith as well. The composting takes only 25-30 days for completion. Further as the pith also gets degraded the nutrients in the coir pith gets added to the compost and it is nutrient rich.

3. Mass production of Arbuscular mycorrhizal fungi and quantitative assessment (VAM / AMF)

Methodology: Arbuscular mycorrhizal fungi (AMF) are obligate symbionts and thus require a plant host for nutrition and reproduction. Plants supply carbon to the fungi, and fungi provide the plant with nutrients such as nitrogen and phosphorus and can improve drought tolerance. VAM mother cultures were

procured from TNAU and the experiment was conducted in large at Pazhaniyarpalayam watershed. Plant roots and soil were examined under the microscope.

Outcome: *Zea mays* were grown in vermiculite added with 10% soil and VAM mother culture showed effective VAM growth in the plant roots as well as soil. The root of AMF inoculated plants and soil were observed with great infection, under the microscope.

Fig.1: AMF root colonization in maize plants

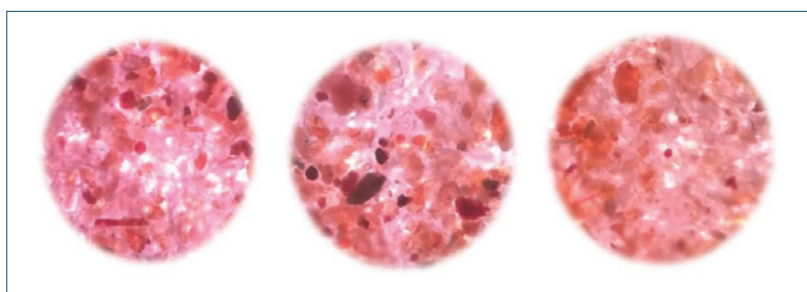
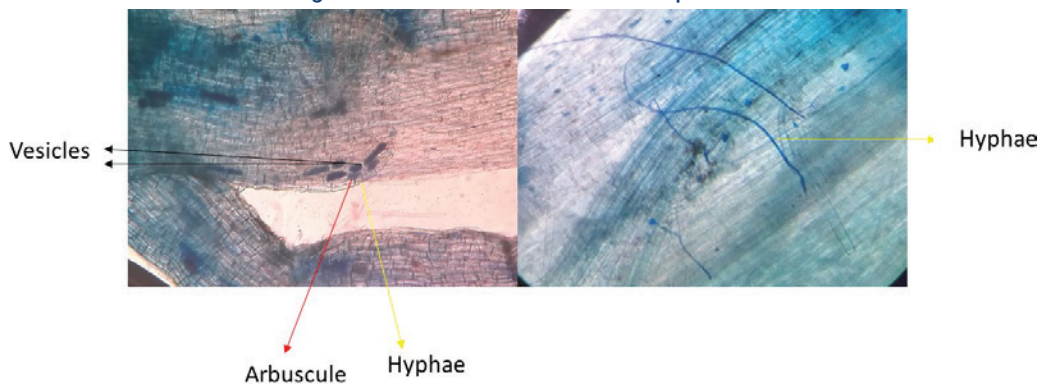


Fig. 2. Representative images showing the AMF spores observed in rhizosphere soil of maize plants

4. Enzymatic activity studies of composting microbial isolates

Methodology: Microbial strains were inoculated (pin-point) on skim milk agar plates,

starch agar medium plates, cellulose congo-red agar media, nutrient agar plates supplemented with calcium chloride monohydrate & tween 20 and xylan agar medium

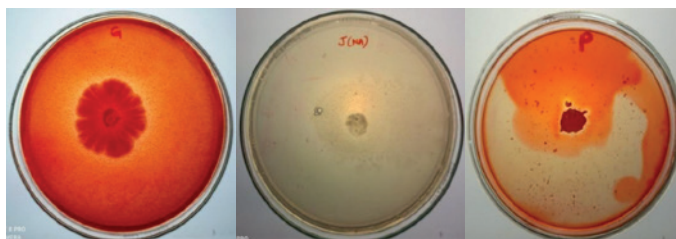
(0.5% xylan) for proteolytic, amylolytic, cellulolytic, lipolytic and xylanase production respectively and incubated. Zones of hydrolysis and precipitation around colonies

were considered positive for enzymatic activities.

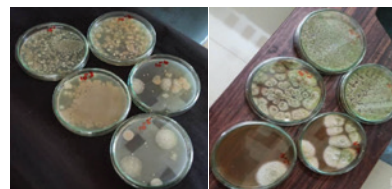
Outcome: Protease positive strains (14 No's), Amylase positive strains (14 No's), Cellulase positive strains (21 No's), Lipase positive strains (23 No's), Xylanase positive strains (17 No's) were found and the results were tabulated along with the pathogenicity test results of the isolates to select the most efficient and safe ones.



Enzymatic studies



Enzymatic activities of fungal strains



Strains	Pathogenicity	Protease	Amylase	Cellulase	Lipase	Xylanase
I (<i>Aspergillus fumigatus</i>)	-ve	Yes	-	Yes	Yes	Yes
II (<i>Gilbertella persicaria</i>)	-ve	-	Yes	Yes	-	Yes
III (<i>Aspergillus aculeatus</i>)	-ve	-	-	-	Yes	Yes
IV (<i>Aspergillus flavus</i>)	-ve	-	-	Yes	Yes	Yes
V (<i>Lasidiplodia pseudotheobromae</i>)	-ve	Yes	-	Yes	Yes	-
VI (<i>Penicillium singorense</i>)	-ve	-	Yes	Yes	-	Yes
VII	-ve	-	-	-	-	-
VIII	+ve	-	Yes	-	-	Yes
IX	-ve	-	-	-	-	-
X	-ve	-	-	Yes	Yes	Yes
XI	+ve	-	-	-	-	-
XII	+ve	-	-	-	-	-
XIII	+ve	-	-	Yes	-	Yes
XIV	-ve	-	-	-	-	-
XV	-ve	-	Yes	Yes	-	Yes
XVI	-ve	-	Yes	-	Yes	Yes
XVII	+ve	Yes	Yes	Yes	Yes	-
XVIII	-ve	-	Yes	Yes	-	Yes
XIX	-ve	-	Yes	-	Yes	-
XX	-ve	-	Yes	Yes	Yes	Yes
XXI	+ve	-	-	-	-	-

5. Bulk production of composting microbial inoculum

Based on the above results, bacterial, Actinomycetes and fungal cultures were selected as consortium members.

Inocula were prepared and bulk cultures were obtained for application studies (10 litres approx.) and stored aseptically in sterile cans. This microbial consortium further started using at Kunnamkulam plant as a pilot study to bio-convert 10 tons organic wastes.



Field trials at Kunnamkulam



6. Leaf Litter Biocompost Studies

Methodology: In order to check the efficiency of microbial inoculum on degradation of leaf litter, an experimental study was framed where dry leaves and dry ground leaves were taken in biocompost bins for the study. The experimental set-up is as follows;

- Dry leaves + Inoculum
- Ground leaves + Inoculum
- Dry leaves + Jaggery + Biofloc Slurry + Inoculum
- Ground leaves + Jaggery + Biofloc Slurry + Inoculum
- Dry leaves + Jaggery + Biofloc Slurry + Inoculum + Mushroom Bed Waste
- Ground leaves + Jaggery + Biofloc Slurry + Inoculum + Mushroom Bed Waste

The work is in progress.

7. Works on anaerobic digestion and bio-hythane production

A combination of biogas and hydrogen is known as bio-hythane. We are planning on an experiment to produce bio-hythane by combining anaerobic degradation with microbial fuel cells. The experiment needed proper anaerobic seeding sludge which is currently not available at IRTC campus, so I started preparing seeding sludge from cow dung by adding canteen food waste daily using small container as anaerobic digester. The process will take some time to generate highly efficient seeding sludge which can be used for the experiment.

It is almost taking one month to have a good quality seeding sludge from the above experiment. Because in between a SMA test was conducted using food waste using the prepared sludge but it was failed due to souring, because the sludge is not having enough microbial population to carry out the degradation.

SMA test

100 ml of seeding sludge is diluted with 300 ml of distilled water and added with 31.35 g of fresh grinded food

waste (5g volatile solids) at an inoculum substrate ratio of 1. Entire set up Incubated at ambient temperature. Saturated brine displacement method was used for measuring produced biogas.



Seeding sludge

The prepared seeding sludge will be effective only after a month of incubation.

Some sludges were collected from the bottom deposit of ABR near MBBR and are subjected to specific methanogenic test to find out the efficiency of the seeding sludge, only a single round of experiment is conducted, at least need three trials to find the exact efficiency, and the experiments are on the way.

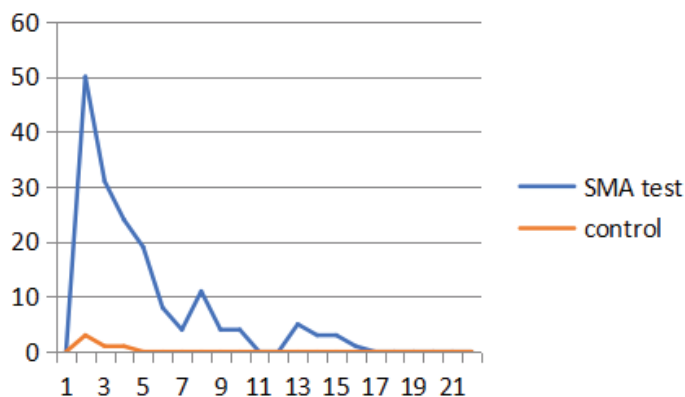
SMA test

400 ml sludge collected from ABR was transferred to anaerobic batch bottles with saturated saline water displacement method for biogas measurement added with 1.0 g D-glucose

Results

The expected biogas production was 2700 ml biogas (from previous experimental data) but obtained only 162 ml, only 6% of the expected result. The pH

of the system was abruptly goes below the optimum level and started souring. So results of the experiments were not satisfactory to use the seeding sludge for further experiments.



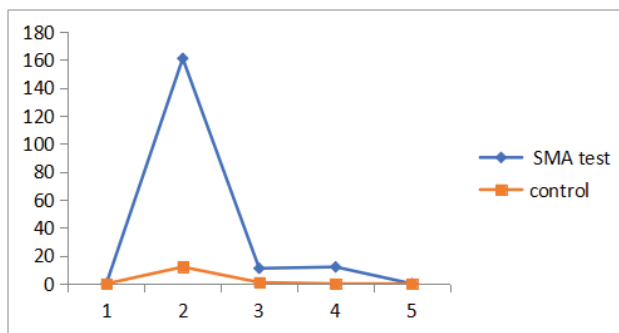
Specific Methanogenic Activity (SMA) Test

(dextrose) and subjected for incubation under ambient temperature without adding any additional micronutrients (which is recommended for SMA test, but here testing the actual potential by not adding nutrients) to test the activity of microorganisms inside the seeding sludge. The theoretical

COD of dextrose is 1g O₂/ g dextrose, so we are expecting a theoretical methane production of 350 ml, at 60% methane concentration the volume of biogas should be 580 ml. SMA test should run for at least 3 trials, right now only one trial is completed and second one is on the way.

Results

Test results in a cumulative biogas production of 171 ml only produced 30% of the expected biogas.



1. Production of biogas from lignocellulose biomass:

Some experiments were conducted on the biodegradability of lignocellulosic biomass waste such as sugarcane bagasse for the biogas production. This is a continuation of my PhD work. Combining Biohythane production from lignocellulose waste may help the better utilization of mostly wasted lignocellulosic biomass. Experiments are in progress.



Degradation lignocellulose biomass experiment

Experiment is in progress and results are awaited.

Future research goals

- Development of an effective microbial consortium for faecal waste treatment.
- Development of various probiotic consortia.
- Portable treatment units to manage solid waste (for chicken stalls etc).
- Poultry waste bioconversion.
- Biofertilizers.

Energy Division

E-learning programmes in the area of Energy audit

An education programmes along with Ottotractions and Energy Management Centre, Government of Kerala was sanctioned this year. The course will begin by August 2021 and will be currently run-in online mode.

Head

C.T. Ajithkumar

Team

Shinton P.C., Sreeraj P.

Internship programme for M. Tech Translational Engineering

To understand in depth the rural innovation, technology and management, a batch of six students doing M.Tech in Translational Engineering, Barton Hill Govt. Engineering College (2019-2021 batch), Thiruvannanthapuram, attended an internship programme at IRTC which was coordinated by the

Energy Division. It was decided to have practical sessions of the various technologies undertaken by the IRTC and to have the site visits of the projects implemented by IRTC.

The construction of the Biofloc tank was an important part of the

Internship Guide

Prof. B.M. Mustafa

Internship Co-ordinator

Sreeraj P.

Date and Duration

Six weeks

(From 25th January, 2021 to 6th March 2021)



internship program. As part of that, they completed the construction of the tank from beginning to end. Also, they were trained for the preparation of probiotics and perform water quality analysis.

Theoretical and practical sessions on Green Energy audit and Carbon foot print with Benzy Zaccaria, a govt. consultancy for energy saving. They also draw a design for the renovation of the existing mushroom shed at IRTC. The students underwent a three days long practical and theoretical training on GIS and remote sensing.

The field visit included are

- Solid waste treatment plant at Kunnamkulam and Guruvayoor
- Site inspection of biofloc construction conducted at Banglamkunnu Ezhakkad owned by Reji



Biofloc construction process

- and Mohandas at Varod for giving the technical guidance and support to the beneficiary of a NABARD assisted scheme supported by IRTC.
- Site visit conducted to Nilambur for visiting the project implemented by IRTC under NABARD scheme situated in Chaliyar Grama Panchayth. The

project implemented is known as Wadi project.

- Silent Valley National Park
- Site inspection conducted at Attapady to visit the Wadi project assisted by NABARD



Windrow Composting at Kunnamkulam/Guruvayoor

Social Science Division

During the current year, the division completed a study project, coordinated several online courses and many submitted proposals got sanctioned.

Head

Dr. Rajesh K.

Team

Anagha E., Binil Kumar T. Ramanath K.R.
Akhil Benny, Anandu K.S., Shibina E., Vishnu Sagar

Project Outlay

INR 6.30 Lakh

Exploring potential of local governments in improving quality of Secondary education: mapping experiments and prospects of Thrissur District Panchayath, Kerala (UNICEF)

This project will enable us to formulate policy recommendation and process for a better planning exercise to improve secondary education quality through a state-level initiative in close collaboration with Kerala State Planning Board. The project is funded by UNICEF.

Deliverables: Documenting the interventions of District Panchayat in secondary education and mapping the potentials of a District Panchayat in transforming secondary education and formulating policy recommendation and process for a better planning exercise to improve secondary education quality through a state level initiative. Develop improved protocols and practices for planning and implementation in the domain of secondary education.

Online awareness Programme on Community Mental Health

Online Awareness programme

on community mental health was held from 14th to 18th of September 2020 via Google meet platform. It was an introductory awareness programme intended to introduce the concepts related to mental health and well-being in the context of Kerala. The programme was conducted among students and general public who do not have any formal training in Psychology or Mental Health. A total of 22 people participated and online certificates were distributed. Dr. Chinchu C. led the sessions.

Online Course on Research Methodology in Social Sciences

Online course on Research methodology in Social Sciences was held on first week of November via Google meet platform. The main contents of the course include Introduction to Social Science Research, Qualitative Research & its Tradition, Methods of Qualitative Research, Quantitative Research and Methods, Research writing

Principal Investigator

Dr. K. Rajesh.

Research Coordinators

Binil Kumar T., Anandu K.S.

Research Assistants

Shibina E., Vishnu Sagar

Funded by

UNICEF

and Popular Writing. It was an activity-oriented programme by involving assignments, academic writing exercises etc. The online certificate was distributed among 30 participants of the course. The sessions were led by Dr. Rajesh K., Dr. Chinchu C., Dr. Malish C.M. and Akhila M.

Projects Sanctioned

- Status assessment of women Co-operative society working under Vanitha Fed (Vanitha Fed)
- Social audit of mid-day meal programme in Kerala (MHRD)
- Research and studies under MGNREGS (LSGD)

Livelihood Division

Aquaculture Unit

Team Members

Swathy R., Prameela G.

RAS-Aquaponics with MBBR System

The RAS-Aquaponics system has been launched at IRTC under the “Blue Revolution Scheme” of the Department of Fisheries, Kerala. It is a technology that combines Aquaponics and Re-circulatory systems.

About 3000 numbers Genetically Improved Farmed Tilapia (GIFT) fish seeds were deposited. Approximately 616 Kg of fish was harvested excluding mortality.

Construction of four Biofloc units is in progress. Each tank is intended to hold different species of fish.

Training to fish farmers and new aqua entrepreneurs

IRTC provides training in advanced aquaculture technologies such as RAS, Aquaponics and Biofloc. In the background of covid-19, training was given to six batches of not more than six persons in a batch.

The preparation of probiotics required for the biofloc units was prepared at IRTC along



Preparation of probiotics for Biofloc

with providing training on the same for four interested persons.

A model unit of RAS-Aquaponics has been commissioned as part of the KFW soil project at Poothanakkayam and Konnakkalkadav watershed. The Aquaculture Unit of IRTC provided all the technical assistance for its implementation.

IRTC fisheries Division conducted classes on RAS-Aquaponics, Biofloc for fish farmers under the krishibhavan in Alanallur and Thachanpara.

Propagation of “Leafish” Garden

The leaves play an important role in feeding the fish. So, the

IRTC fisheries division built a new plantation-LEAFISH Garden. There are a variety of protein- rich leafy vegetables that are grown in the garden. Prior to this Azolla and Lemna were also grown here.

Biogas Production from Fish waste

RAS-Aquaponics Filter system produces biogas from slurry that accumulates in the settling tank- an innovation by IRTC.

Popularising Biofloc fish cultivation in Palakkad district

The project involves Popularising of Biofloc Fish Cultivation in Palakkad district by setting up two biofloc units and training of 250 farmers in biofloc fish culture.

Intended benefits and deliverables of the Project/ Programme

Integrated Rural Technology Centre (IRTC), Palakkad may ensure the following deliverables during the process of implementation of the project: To Set up two units for biofloc fish culture. Provide training to 250 farmers in biofloc technology in fish cultivation in 10 batches of 25 farmers each during the project period of 24 months

for increasing the income of the marginal farmers, small farmers in the project area . The prime objectives are to Increase in fish productivity and to improve technical competence of farmers in adapting new technologies. . Maximum effort should be taken that majority of the farmers who got training start biofloc fisheries availing credit from bank and the trained farmers/beneficiaries has to form an FPO as thrust in fresh water fisheries.

Two biofloc demonstration units have been installed and commissioned at Ezhakkad and Varode by utilizing the first instalment of grant released by NABARD.

Program Coordinator

Prof. B.M. Musthafa

Scientific support

Swathi R.

Technical Support

Sreeraj P.

Funded by

NABARD

Total Outlay

INR 28.29 Lakhs;

Grant

INR 11.61 Lakhs

Technical Advisors

Dr. N.K. Sasidharan Pillai,

Dr. V.S. Jalajakumar, R. Satheesh



Biofloc demonstration units installed and commissioned at Ezhakkad and Varode

Mushroom Unit

IRTC has established the mushroom production center in the year 1995. A central spawn cultivation unit as well as a model mushroom cultivation unit is operating at IRTC. The objective of the unit is to impart training in mushroom cultivation and to extend technical support to mushroom growers in and around Palakkad. We particularly focus on the production of Oyster Mushroom cultivation.

Mushroom Production

The production of oyster mushroom per day has been 1-1.5 kg kg. This can be achieved by laying around 15 beds per day.

Spawn Production

IRTC is preparing spawn from Sorghum vulgar as the possibility of contamination in this case is much less. Our production capacity is around 1000 kg of Mushroom spawn every month and we produce around 600 kg as per the booking by farmers

Training Programs

During the year 2019-2020 IRTC has conducted two training programs in collaboration with Pudukkottai Krishi bhavan with the participation of 30 persons at Puliampully and 20 persons at Krishi Bhavan itself.

Head and Incharge

Surya Sethumadhavan

Team Members

Sunitha P.L. , Padmavathi P.V.

Sajitha N.C., Sudha P.S.



Hands on training in Mushroom

Mushroom production and sales details		
Sl. No.	Particulars	Quantity
Production		
1	Total beds prepared	2008
2	Damaged due to contamination / Lock down	67
3	Total production of mushroom	425 kg
Sales		
1	Dry mushroom(50 g pack)	18
2	Mushroom bed	63

One day training program at Mundur Krishi Bhavan on the Topic Introduction to Mushroom Cultivation and the residue management for 15 Persons was also conducted. Online training on the topic Post harvest technology in

Mushrooms was done with the participation of 100 members Organised by Kerala Institute For Entrepreneurial Development.

Demo and hands own programmes for ATMA teams with the participation

from various Krishibhavana according to their need at their site was also conducted. Training and demo for students from colleges of Kerala and Tamil Nadu was done at IRTC Campus.

Construction of a new hightech mushroom production shed is being completed.

Mushroom division has undertaken the following activities

1. Inhouse Projects;

- a. Quality checking of the spawn produced in the in-house lab and compare the following with the spawn from TNAU.
 - i) Spawn running
 - ii) Harvesting
 - iii) Production
- b. Testing the temperature susceptibility of the in-house mother spawn
- c. Culturing of mother culture from various mushroom parts
 - a. Fresh and newly harvested mushroom using different culture media (Success and sold 5000 bed spawns to farmers)
 - b. From mother spawn (Failure due to bacterial contamination)

Pottery and Decoupage Unit

Work on Traditional Pottery started in IRTC nearly a decade back. Development of machineries like motorised potters' wheel, mini pugmill etc. were introduced first and diversification activities like promoting decoupage work, terracotta ornament making and relief work introduced later. During the reporting period our activities were in a very slow pace due to the pandemic- customers were few, work orders very limited. Still, we tried to pull on with the following work.

1. New designs of ornaments with attractive shadings
2. Production of red clay cups using Jigger Jolly Machine for keeping indoor plants and also for decoupage work

Division Head

Dr. M. Lalithambika

Team Members

Subesh Babu, Geetha Rema R., Yasoda

3. Preparation of terracotta wind chimes (hanging bells)

From Decoupage work we could generate Rs. 90000/- (Ninety Thousand only) during the reporting period. Our clients during 2020-21 were organizations like Kendriya Vidyalaya, Kanjikode, KFRI, Nilambur, Veterinary College, Thrissur and schools from various Panchayaths.



Pots for indoor gardening



Windchimes

Value- Added Products from Jackfruit, Mango and Papaya

Their Validation and Dissemination

This project was initiated in May, 2018. Under this program several value – added products viz. Jackfruit powder, jackfruit candy, jackfruit biscuit, jack fruit squash, Mango toffee, papaya tutti frutti etc. were standardised. Although it was a one-year program due to the seasonal nature of jackfruit and also due to the inconvenience caused by the pandemic the project was under extension till June 2021.

During Nov. 2020 there was an on-line presentation of the whole work. The progress was adjudged satisfactory. The work remaining to be done was glycemic -index studies - a comparison of glycemic potency of jack fruit and rice. It was also suggested in the meeting that a CD on Value – Addition also may be submitted along with the Completion Report.

Accordingly, CD was prepared at IRTC. The glycemic potency study was also completed. Jackfruit powder and Champa raw rice powder, sieved through a 2mm sieve was used for investigation. 20 gms each of the powders were mixed with 60 ml water and microwaved for 1 min. This semi-cooked food was consumed and the blood plasma sugar level monitored for 2 hours. The blood sugar values obtained for these two samples at 120 min. indicated that the glycemic potency of jackfruit is definitely lower compared to rice.

The study of glycemic potency of various food items is of great significance as it helps to maintain good health.

Principal Investigator

M.M. Sreekumar, Scientist (retd),
NIIST., Trivandrum

Co – Investigator

Dr. M. Lalithambika, IRTC

Team Members

Ajay Ravindran, Prameela,
Bhageerathy V.V.

Funding Agency

KSCSTE under RTP

Our marketing strategy under this situation is through GRAMA KALA. IRTC's permanent sales outlet. The completion report along with CD has been duly submitted to the sponsor.



Preparation of mango candy



Preparation of dried jackfruit



Jackfruit powder

IRTC Laboratory

1. Establishment of Soil Testing Laboratory:

Established Soil testing Lab with facilities for testing of Soil Texture PH, EC, TSS, Soil Macro Nutrients Viz: Nitrogen (Organic Matter Content) Phosphorus, Potassium, Secondary Nutrients: Calcium Magnesium and Sulphur, Micro Nutrients: Iron, Manganese, Copper, Zinc and Boron.

Software Development

A software was developed for the purpose of: soil classification based on nutrient classes and proposals for improving soil health by using soil ameliorants and also to provide organic and fertilizer recommendations to all crops to be given farmers.

2. Compost Testing

Laboratory facilities upgraded for the complete analysis of Organic Manure Viz: Moisture content, density Particle size organic matter content organic carbon Nitrogen, phosphorus Potassium Secondary and Micro nutrients also.

3. Leaf Analysis

Modified Laboratory for analysing Plant samples

5.Lime Quality Control Tests

Improved laboratory facility for Quality Control Analysis of Lime and Dolomite Samples.

Head

A.N. Sivadas

Team

Sandhya O.K., Reshma C., Sreedevi R.K., Athul Gabriel K.M. Ajeesh K., Anju Asokan, Chikku Marin John



AAS Lab

Tests conducted and health card prepared and issued

Soil Samples (Water shed)	1399
Soil samples Private	0010
Total	1423

Tests conducted

Compost samples (own)	30
Compost Private	04
Total	34

6.Water Testing

Water samples tested 2020-21: 756

7. Internship and Project

Many students utilized our Laboratory for Internship and Project works.

Water testing facility |





Library, Publication and Documentation Cell

IRTC library has an extensive collection of books in the field of research and development. This year, additional set of books were purchased.

The Publication and Documentation Cell coordinates the internal and external communications of IRTC. One of the major works undertaken by the cell was to revamp the official website. Also, the publication and documentation cell produced four newsletters including a special edition on waste management activities carried out under Harithasahayasthanam. During the current year, a monograph on watershed related activities of IRTC was also completed. Edited and designed the reports for

UNICEF, UNDP and SAF. The documentation cell produced more than 20 videos for various divisions including a documentary on IRTC-NABARD TDF Project.

The documentation cell co-ordinated all the three online courses run during 20-21. Apart, four webinars and more than 20 online meetings were co-ordinated. Several brochures were prepared and designed for Centre for Geoinformatics, Soil Testing Laboratory, Energy and Green Audit, and for IRTC letterhead and notepad.

A student from Malayalam University, Ardra K.S. did her internship at the Publication and Documentation Cell of IRTC.

Team members

Librarian: Vinayak Vijayan

Documentation: Akhila M.

Prajeesh A.

Ashik Ibrahim Mechikkottil

Haritha Sahaya Sthapanam

During 2020 – 21, the Haritha Sahaya Sthapanam (HSS) of IRTC functioned as a continuation of previous year and undertook various activities including providing technical support to local government institutions for their waste management. This year, 66 local bodies have signed agreements with IRTC. In addition, we were entrusted with the waste management of seven local bodies by UNDP.

The COVID 19 pandemic, which has been rampant since the end of last year (2019-20), has disrupted the work of local bodies. Following the lockdown, local bodies signed agreements with IRTC for the years 2020-21 in August, September and October. Meanwhile, the local body elections and the second wave of COVID 19 have seriously affected the activities. However, due to the previous years' experience and careful planning, the IRTC has been

able to intervene and make the most of most local bodies.

When Haritha Sahaya Sthapanam took over the operations in 2019-20, there was only some orders and

State Co-ordinator

T.P. Sreesankar

Team

Dr. K. Sreedharan, Sandra Vijayakumar
Subhash S., Jayan Chambakkulam,
Jayaprakash P.



| Review meeting of HSS coordinators

circulars of Haritha Kerala Mission in front. However, we have taken an adventurous step by deploying staff in all the local bodies that collaborated with IRTC. For the most part, there were no infrastructure or even a Harithakarmasena (HKS) in

LSGDs. Extensive campaign activities were also needed to change the attitude of the people.

For the continuous monitoring and evaluation, the work was divided between Assistant Coordinators, Technical Assistants, Cluster Coordinators, Regional Coordinators, and State Coordinator. Although there were many similarities, the problems and possibilities in each local body were different. Based on each study and analysis, the activities were carried out by



| Review meeting of HSS coordinators

formulating an action plan suitable for the local body. At various stages, training was imparted to people's representatives, bureaucrats, HKS Members, shopkeepers, hotel and restaurant operators, catering workers, wedding halls, churches, school and office heads and Members of Kudumbasree. An extensive campaign was planned to convince the public of the need for scientific and comprehensive waste management. The most arduous task was to ensure door-to-door collection in all homes and establishments. Accurate monitoring should also be ensured in this regard.

The problem was exacerbated by the lack of space at the Material Collection Facility for segregating the collected inorganic waste and the lack of a block level RRF and the limitations of the Clean Kerala company. Waste disposal can often be facilitated by finding private agencies. The majority of HKS members are from socially,

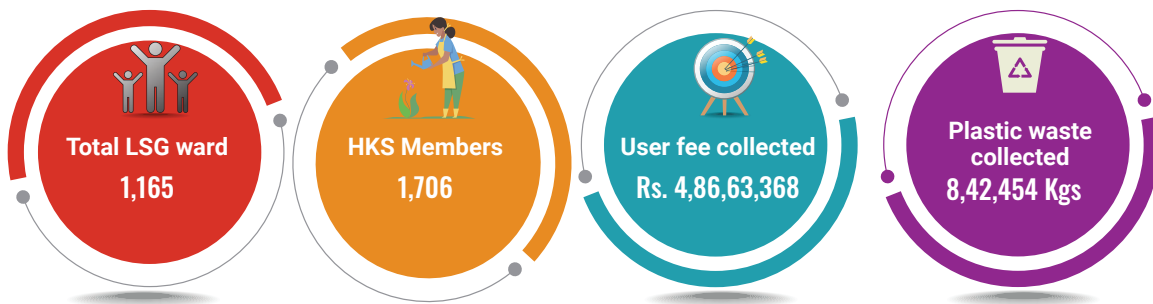


| Plastic segregation process

economically and educationally backward sections. They have been trained by the IRTC Coordinators to keep accurate accounts and registers. Notices, cards and campaign posters were prepared and distributed as part of the campaign. Twice the required posters were printed and distributed to the entire local bodies. Various trainings programmes were also organized for the HKS members with the aim of generating additional revenue. Although a mobile app was developed to coordinate the activities, most of the HKS members did not have the

smart phones or tablets to use it, so the LSGDs decided to use it after purchasing it. During the year 2020-21, out of 63 LSGDs, 1165 wards were selected consisting of 1706 HKS members. Total amount of plastic waste collected during this year was 842454 Kgs and the revenue was generated as User fee is Rs. 4,86,63,368. In all the local bodies in which the people's representatives and officials have cooperated, the work of the Haritha Karma Sena has been organized and an exemplary action plan has been formulated.

Achievements of Haritha Sahaya Sthapanam



Project Implementation Unit (PIU)

Project implementation unit was founded in the year 2016 as a sister concern to accomplish various research and development activities carried out by IRTC. PIU focus to find friendly solution to waste management issues within the state and execute various the action plan for LSGD, government agencies in a predetermined period. PIU undertakes both engineering projects such as decentralized methods to manage bio & non bio degradable waste materials at community level and non-engineering projects such as distribution bio bins, etc. and also providing technical assistance in installing household level biogas units.

PIU placed its footsteps in the area of waste water treatment and undertaken the construction and maintenance of five sewage treatment plants with 80-100 KLD capacities.

Currently PIU is performing the annual maintenance contract of some of the projects completed by PIU; Biogas plants in Trivandrum medical college, Windrow compost plants in Kunnamkulam, Guruvayoor and Irinjalakuda Corporation and Sewage treatment plant at Ottapalam Taluk Hospital

During this financial year PIU had an opportunity to complete 164 engineering projects and 263 non-

Chairman

K.K. Janardhanan

Secretary

A.K. Mathew



Construction of biogas plant at Kerala Kalamandalam, Cheruthuruthy, Thrissur

engineering projects. The list of completed projects along

with spilled over projects of previous year are listed below;

District	Engineering Works	Non- Engineering Works	Total
Trivandrum	19	7	26
Kollam	26	42	68
Alappuzha	18	17	35
Pathanamthitta	7	27	34
Kottayam	19	41	60
Idukki	3	2	5
Ernakulam	7	13	20
Thrissur	18	20	38
Palakkad	24	43	67
Malappuram	13	26	39
Kozhikode	6	18	24
Wayanad	2	3	5
Kannur	1	2	3
Kasaragod	1	2	3
Total	164	263	427



| Construction of MCF at Malampuzha Palakkad

During this financial year, 70% of the work performed by PIU was under non engineering sector. This includes the production and distribution, technical assistance in installation of Biobin, Bio pot, Bucket compost, Kitchen bin, biogas plants at household levels and all these tasks were under the performed by Parishad production centre (PPC) which function as a service provider. In addition to this, the distribution of various machineries required for

composting units, supervision of engineering projects in Thrissur and Palakkad district were also carried out by PPC.

Apart from the local self-government, departments such as SC development, tourism, Alappuzha, Kalamassery and Kottayam medical colleges, CUSAT, Maharaja's College has also provided opportunity to handle various projects. Eventually, enquiries are increasing from local self-government and other institutions owing to

PIU's s excellence in waste management projects and social concern.

In addition to solid waste management projects, liquid waste management & septage treatment was also undertaken during this year. Moreover, PIU had opportunity to refurbish non-working biogas plants, sewage treatment plants, performed bio-mining and segregated the waste materials.



| Construction of biogas plant CUSAT, Ernakulam



| Construction of biogas plant at Govt. Model Residential School, Kaniyampetta, Wayanad

Major Trainings/ Workshops/ Webinars

IRTC Webinars

1. Geospatial tools in local level planning- 26th August 2020, Nizamudeen A., Land Use Commissioner, GoK
2. Decentralised Waste Management: Sustainable Methods- 14 September 2020
 - Waste Management at Source, Practical Approaches – Prof. P.K. Raveendran
 - Waste Management, IRTC Interventions – V.G. Gopinathan
 - Harithakarmasena- T.P. Sreesankar
3. Land and Water Management Practices with Special Reference to Kerala- 3 October 2020
 - Agricultural Practices in Drought Prone Areas; Dr. R. Surendran U., Senior Scientist, CWRDM
 - Land Use Policy for Sustainable Natural Resource Management; Nizamudeen A., Land Use Commissioner, GoK
 - Watershed Development Lessons Learned; R. Satheesh, IRTC
4. New Farm Amendment Bills- 15 October 2020, Dr. C. George Thomas, Director of Research, IRTC

Invited Talks and other programmes

Anand Sebastian

Centre for Geoinformatics

1. Lecture delivered on the topic “GPS Technology in Surveying” held on 29th March 2021 conducted by Government ITI, Chittur, Palakkad
2. Expert faculty member for “Town planning master plan preparation” at KILA from 19-20 April 2021
3. Invited speaker on the topic “Introduction to application of GIS and Remote sensing in biodiversity conservation” held on 03/May/2021 as webinar conducted by Kerala State Biodiversity Board
4. Guest speaker on the topic “Basic of GIS and Geospatial Sciences” on 19th May 2021 organised by Nansen Environmental Research Centre (India).

R. Satheesh, Natural Resources Management Division

5. On June 5, world environment day was celebrated with webinar on the theme climate change and food security.

TRAINING LIST APRIL 2020-2021		
Sl. No.	Programme	No. of participants
1	Aquaponics	32
4	KSSP SAMSTHANA CAMP	5
6	Theeramythri	7
7	HSS	4
8	Vignayanolsavam	9
10	RAWE	11
11	Mushroom	8
12	GIS	30
13	CGM PFA Meeting	25
14	HSS	40
16	KSSP Jilla Chumathalakarude Shilpasala	35
17	Intership students Barton hills	6
18	KAU RAWE Programe	13
19	Science Activity centre Silpasala	20
20	Jilla Panchayath Meeting	20
21	Suchitwa Mission	75
23	Kalajatha KSSP	18
25	Vidhyabyasa Yogam	7
26	IRTC Executive Thrissur	13
27	Nirvahana Samithiyogam	55
28	Kudumbasree Training	75
29	Kalajatha	11
32	Vignayanolsavam KSSP State	30
33	KSSP Palakkad Jilla Committee	20
34	Women lawyers	9
36	Disaster Management Team Kottayam	160

Programmes and Events



World Ozone Day Celebrated at IRTC

AIPSN Executive member Dr. Vivek Monteiro inaugurating the workshop for setup a Children's science pak in IRTC



NABARD CGM P. Balachandran visited the watersheds Konnakkalkadavu and Poothanakkayam and interacted with the Village Watershed Committee members

The inauguration of the 3R Package project has been done by J. Mercykutty Amma, Minister of Fisheries, Cashew and Industries at Civil Station, Kollam on 15-08-2020



Appendix

Student Projects & Internships

MSc Projects 2020-2021 Under SWM Division			
Sl. No.	Name of the Student	Name of the College	Project Title
1	Rosamma Joseph	Hindhustan College of Arts and Science	Bioremediation of Pesticide Using Different Species of Fungi
2	Sumaya	Hindhustan College of Arts and Science	Comparative Antimicrobial Properties of Some Edible Mushrooms and Evaluation of Their Dehydrogenase Effects
3	Anjali	Hindhustan College of Arts and Science	Evaluation Of Antifungal Activity of Garcinia Cambogia
4	Haritha	Hindhustan College of Arts and Science	Extraction And Monitoring Antimicrobial Activity, Rhizosphere Activity and Pesticidal Activity of Cashewnut Shell Oil (Cnsl)
5	Safreena K. A	San International College of Arts and Science	Bacterial Pigment with Antimicrobial Potential for Development of Nail Color
6	Asma H.	San International College of Arts and Science	Bacterial Pigment as Hair Dye with Antimicrobial Potential
7	Shamna N.	San International College of Arts and Science	Determination of Anti fungal Property Of Sapindus Mukorossi(Indiansoapberry), Trigonella Foenum-Greacum (Fenugreek), Vigno Mungo (Black Gram): Against Malassezia Furfur Fungi For Anti-Dandruff Shampoo Formulation
8	Athira A.	Rathnavel Subramaniam College of Arts and Science	Effective Microorganisms for Tap Water Purification: A Pilot Study
9	Remya. C.	Rathnavel Subramaniam College of Arts and Science	A Preliminary Approach on Grey Water Treatment with Em Mud Balls
10	M.V. Harsha	Rathnavel Subramaniam College of Arts and Science	Evaluating The Effect of Em Mudballs in Aquaponics Water
11	Mirsana V.P.	MES M.K. Mackar Pillay College for Advanced Studies	Composting Of Chicken Waste Using Microbial Inoculum
12	Anjana Krishnan	MES M.K. Mackar Pillay College for Advanced Studies	Composting Of Vegetable Waste Using Microbial Inoculum
13	Anjala Suresh	MES M.K. Mackar Pillay College for Advanced Studies	Composting Of Dried Leaves Using Microbial Inoculum

M.Sc. dissertation works at Centre for Geoinformatics in 2020-'21			
Sl. No.	Name of the Student	Dissertation Topic	Course & Institution
1	Chandu P. J.	Evaluating predictive efficiency of MCDM tool - Analytical Hierarchy Process (AHP) for landslide susceptibility mapping based on 2018-2019 floods at Kuttiyadi river basin, Kerala	M.Sc. Geology, Central University of Kadaganchi, Karnataka
2	Abhilash Nandan	Evaluation and mapping of floods and landslides susceptibility zonation using weighted overlay method at Karuvarakundu Panchayath: A multi-disaster approach	
3	Malavika A.S.	Landfill site suitability analysis using geospatial techniques and Analytical Hierarchy Process in Pudusseri Panchayat, Palakkad district, Kerala	M.Sc. Environmental Sciences, PG & Research Department of Environmental Sciences, Bishop Heber College, Tiruchirappalli, Tamil Nadu
4	Athulya J.	Assessment of spatio-temporal variation of Urban Heat Island in Palakkad municipal area using Space Based Matrix Indicators	
5	Akhila M.	Flood hazard mapping using GIS in Bharathappuzha river, Karimpuzha region	M.Sc. Environmental Studies, Thunchath Ezhuthachan Malayalam University, Malappuram

Student Internships		
Sl. No.	Name of the Student	Institution
1	Aruna V.	M.Tech, Translational Engineering, Barton Hill Government Engineering College, Thiruvananthapuram
2	Mahesh T.S.	M.Tech, Translational Engineering, Barton Hill Government Engineering College, Thiruvananthapuram
3	Ramachandran P.G.	M.Tech, Translational Engineering, Barton Hill Government Engineering College, Thiruvananthapuram
4	Salini S.	M.Tech, Translational Engineering, Barton Hill Government Engineering College, Thiruvananthapuram
5	Shamnad J.	M.Tech, Translational Engineering, Barton Hill Government Engineering College, Thiruvananthapuram
6	Sumesh V.M.	M.Tech, Translational Engineering, Barton Hill Government Engineering College, Thiruvananthapuram

Sl. No	Name of Students	College	Qualification	Title of the Project	Project/ Internship
7	Ardra.K.S	Thunchath Ezhuthachan Malayalam University, Tirur	MA Media Studies		Internship
8	Nandini.G	Nehru Arts & Science College, Thirumalayampalayam Coimbatore	BSc. Microbiology		Internship
9	Darsana.P	Nehru Arts & Science College, Thirumalayampalayam Coimbatore	BSc. Microbiology		Internship
10	Anagha A	Nehru Arts & Science College, Thirumalayampalayam Coimbatore	BSc. Microbiology		Internship
11	Greeshma K.G	Nehru Arts & Science College, Thirumalayampalayam Coimbatore	BSc. Microbiology		Internship
12	Haritha H.	AJK College of Arts and Science, Navakkarai, Coimbatore	BSc. Biotechnology		Internship
13	Greeshma V.	Nehru Arts & Science College, Thirumalayampalayam Coimbatore	BSc. Microbiology		Internship
14	Suji.S	Nehru Arts & Science College, Thirumalayampalayam Coimbatore	BSc. Microbiology		Internship
15	Varsha.M	Nehru Arts & Science College, Thirumalayampalayam Coimbatore	BSc. Microbiology		Internship
16	Raji Krishna A.	Nehru Arts & Science College, Thirumalayampalayam Coimbatore	BSc. Microbiology		Internship
17	Sneha H.S.	AJK College of Arts and Science, Navakkarai, Coimbatore	Bsc. Biotechnology		Internship
18	Anjali Sreekumar	Dhanalakshmi Srinivasan Institute of Research and Technology (DSIRT), Siruvanchur, Tamil Nadu		GIS	Internship
19	Anju C. Joy	Dhanalakshmi Srinivasan Institute of Research and Technology (DSIRT), Siruvanchur, Tamil Nadu		GIS	Internship
20	Rakhi P.	Dhanalakshmi Srinivasan Institute of Research and Technology (DSIRT), Siruvanchur, Tamil Nadu		GIS	Internship

21	Clincy Cleetas	Dhanalakshmi Srinivasan Institute of Research and Technology (DSIRT), Siruvanchur, Tamil Nadu		GIS	Internship
22	Hanna Thomas	Dhanalakshmi Srinivasan Institute of Research and Technology (DSIRT), Siruvanchur, Tamil Nadu		GIS	Internship
23	Sandra	Dhanalakshmi Srinivasan Institute of Research and Technology (DSIRT), Siruvanchur, Tamil Nadu		GIS	Internship
24	Priyanka Anil Kumar	Dhanalakshmi Srinivasan Institute of Research and Technology (DSIRT), Siruvanchur, Tamil Nadu		GIS	Internship
25	Alan S.S.	Dhanalakshmi Srinivasan Institute of Research and Technology (DSIRT), Siruvanchur, Tamil Nadu		GIS	Internship
26	Jaganathan M.C	Dhanalakshmi Srinivasan Institute of Research and Technology (DSIRT), Siruvanchur, Tamil Nadu		GIS	Internship
27	Firoz	Dhanalakshmi Srinivasan Institute of Research and Technology (DSIRT), Siruvanchur, Tamil Nadu		GIS	Internship
28	Sreeraj	Dhanalakshmi Srinivasan Institute of Research and Technology (DSIRT), Siruvanchur, Tamil Nadu		GIS	Internship
29	Ivin	Dhanalakshmi Srinivasan Institute of Research and Technology (DSIRT), Siruvanchur, Tamil Nadu		GIS	Internship
30	Mamala P.V.	PCA College, Perundura, Erode, Tamil Nadu	MSc.Chemistry	Studies on pesticidal efficacy of The plant-Honigraphis colorata against stored grain pest sitophilus oryzac	Project
31	Sruthi K.S.	PCA College, Perundura, Erode, Tamil Nadu	MSc. Chemistry	An unprece dented route to Zn nanopesticidel	Project

32	Gayathri S.	Hindusthan College of Arts and Science, Coimbatore	MSc. Microbiology	Extraction and Monitoring Antimicrobial properties of Talinum Triangulare & Basella Alba Leaves.	
33	Haritha K.R.	Hindusthan College of Arts and Science, Coimbatore	MSc. Microbiology	Extraction of cashew nut shell oil and monitoring HS antimicrobials and Rhizosphere effect	
34	Farsana P.A	Hindusthan College of Arts and Science, Coimbatore	MSc. Microbiology	Isolation, Identification and Characterization of probiotic bacteria from fish and their antimicrobial and nitrifying property	
35	Anjali R.	Hindusthan College of Arts and Science, Coimbatore	MSc. Microbiology	Evaluation of Antimicrobial activity of Gorgonia Cambogia	
36	Silpa S.	Bishop Heber, College, Trichi, Tamil Nadu	MSc. Environmental Science	Waste water treatment using coconut husk and banana peel	Project
37	Anju M.	Bishop Heber, College, Trichi, Tamil Nadu	MSc. Environmental Science	Efficiency of Vetiver Grass in Removal of Heavy metals from industrial waste water	Project
38	Nadeemsha N.V.	JCT College of Engineering and Technologies, Coimbatore	BTech. Food Technology		Internship
39	Preena N.C.	Cochin University of Science and Technology, Kalamassery	M.Tech Geotechnical Engineering	Stability analysis and landslide susceptibility assessment of Thamarassery Churam	
40	Fousiya K.F.	Cochin University of Science and Technology, Kalamassery	M.Tech Geotechnical Engineering	Landslide risk assessment and mitigation	

41	Shifana V.H.	Cochin University of Science and Technology, Kalamassery	M.Tech Geotechnical Engineering	Land slide failure mechanism and analysis	
42	Remya C.	R.V.S. College of Arts and Science , Sulur, Coimbatore	M.Sc. Biotechnology	Effect of EM mud balls in grey water	
43	Athira A.	R.V.S.College of Arts and Science , Sulur, Coimbatore	MSc. Biotechnology	Effect of EM mud ball in portable water	
44	Harsha M.V.	R.V.S.College of Arts and Science , Sulur, Coimbatore	MSc. Biotechnology	Effect of EM mud balls in Aquaponics	
45	Sruthilakshmi M.J.	Christ College Iringalakuda, Thrissur	MSc. Environmental Sceience		
46	Abhiram A.H	Central University of Karnataka	MSW	Evaluation study of NABARD -TDF-WADI project in Attappady	

Administrative Wing

Director	: Dr. S. Sreekumar
Registrar	: K.K. Janardhanan
Director of Research (Hon.):	Prof. P. K. Raveendran
Administrative Officer	: M. Ramachandran
Dir. of Liaison & Marketing	: P.V. Joseph
Accountant	: M. Ramani
Cashier	: M. Deepika
Office Assistant	: K.M. Sushama
Office Assistant	: N.R. Sajil
System Administrator	: Shinton P.C.
Computer Operator	: Vilasini V.
Computer Operator	: Rajitha V.
Campus Manager	: V.C. Selvaraj
Driver	: C. K. Raju

Internal Complaint Committee	
1	Smt. Lilly Kartha (Presiding Officer)
2	Dr. K. Rajesh (Member)
3	M. Ramachandran (Member)
4	Akhila M. (Member)
5	Smt. Vijayam (KSSP, Palakkad) (Member)

IRTC Executive Members				
Sl. No	Name	Profession	EC Responsibility	Mail ID & Phone No.
1	A.P.Muraleedharan Theeram Karumalur Ernakulam-681511	State President of KSSP General Manager(Rtd) FACT, Aluva	Chairman	muralitheeram@gmail.com 9495078402
2	K.Radhan Kandiyil, Moolad P.O Kozhikkode	General Secretary of KSSP Head Master, GUP school, Palat, Kozhikkode	EC Member	radhankmoolad@gmail.com 9447876687
3	Santhosh Erath Vasanthavilasam Paravachambalam Nemam P.O Thiruvananthapuram 695020	Govt. Employee Civil Supplies Department of Kerala	EC Member	santhosherath@gmail.com 9495689474
4	Dr.S.Sreekumar Avani.Mythri Nagar, Fr.Dismas Road, Irinjalakkuda - 680125 Thrissur	Rtd. Professor & Head, Dept. of Geology & Environmental Science, Christ College, Irinjalakkuda	Director	sreeavani1961@gmail.com 9447350669
5	K.K.Janardhanan Kizhakkeyil Neelambari,Elayur P.O Malappuram-673679	Registrar of IRTC, Sub Regional Employment Officer(Rtd)	Registrar	kkjelayur61@gmail.com 9495984767
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8	A.K.Mathew Prakruthi Thonnallore Mevallore-686609 Kottayam	Secretary, Project Implementation Unit	EC Member	mathewirtctmc@gmail.com 9495111768
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10	Jagajeevan N. Pulimoottil Veedu, Venjaramoodu, Thiruvananthapuram- 695607	Govt. Employee(Rtd), Department of Health Consultant, Suchitwa Mission Kerala Thiruvananthapuram	EC Member	jagajeevan65@gmail.com 9447172199

11	Prof. P. K. Ravindran Soorya, Njanakkal, Ernakulam-682505	Dy .Director College of Education Govt. of Kerala (Rtd)	EC Member	pkrkssp@gmail.com 9447024920
12	Dr.N.K.Sasidharan Pillai Alummoothil, Kalanjoor, Pathanamthitta- 68964	Deputy Director of Fisheries (Rtd.), Fisheries Department, Govt. of Kerala	EC Member	nkspillai@gmail.com 9446517362
13	V.G.Gopinathan Niranjana, F.C.I,Bi-lane-4, West Chalakkudy, Thrissur-680307	Laison Officer (Rtd.) Department of Health &Family Welfare, Kerala	EC Member	vggopi@gmail.com 9446994927
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15	T.K.Meerabai Thanal,Mathilakam, Thrissur-680685	Asst. Educational Officer (Rtd)	EC Member	meerajinan@gmail.com 9846845178
16	T.Gangadharan Geethika Kanool,Kannur-670564	Former President of KSSP & Rtd. Teacher	EC Member	tgkannur@gmail.com 9495754727
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18	Manojkumar V. Prasanthi, Akathiyur PO Kunnamkulam, Thrissur-680503	District Coordinator, Information Kerala Mission	EC Member	manojkathiyur@gmail. com 9446462637
19	P.V.Joseph Puthanpalli Poonthopu, Alappuzha	Secretary of Parishad Production Centre	EC Member	josephpvalpy@gmail. com 9495543157
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21	Prof.B.M.Musthafa Moochikkad Panayoor P.O Polpully,Chittur -678552	Research Co-ordinator, IRTC (Retd.)Professor , Department of Physics, Govt. College Chittur	EC Member	musthafachittur@ rediffmail.com 9447674942
22	Representative of KSCSTE Thiruvananthapuram		Ex-officio	
23	Representative of DST New Delhi		Ex-officio	

IRTC General Body 2020-21

1.Muraleedharan A.P.	24.Karthiayani V.T.	47.Asokan E.
2.Dr.S. Sreekumar	25.Vilasini E.	48.Balakrishnan A.M.
3.K.K. Janardhanan	26.Babylatha O.C.	49.Muraleedharan C.M.
4.Lilly Kartha	27.Rajini P.P.	50.Dr. Harikrishnan P.
5.Gopakumar P.	28.Jaya M.	51.Ajith Rugmini
6.Radhan K.	29.Mallika R.	52.Praveenlal C.
7.Vinodkumar K.	30.Shailaja L	53.Rajan K. Vaikam
8.Narayanan Kutty K.S.	31.Dr. Sangeetha Chenampulli	54.Premraj K.
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10.Santhosh Erath	33.Vijayam V.	56.Devasiya M.K.
11.Juna P.S.	34.Dr.K.V Thomas	57.Sasidharan Maniyur
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21.Dr. Shaji N.	44.Ravi Prakash K.P	67.Sunilkumar S.L.
22.Meerabai T.K.	45.Joseph P.V.	
23.Ramesh B.	46.Aravindakshan P.	

Research Advisory Committee (RAC) Members -2020-21	
Sl. No.	Name
1	Dr. R. Ajayakumar Varma (Chairman) Former Scientist, NCESS & Executive Director Suchitwa Mission Kerala
2	Dr. K. P. Aravindan Former Professor, Govt. Medical College, Calicut
3	Dr. Abhilash S. Dept. of Atmospheric Science, CUSAT
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5	Dr. C. T. S. Nair Former Exe. Vice President, KSCSTE
6	Dr. P. S. Harikumar Senior Principal Scientist & Registrar, CWRDM
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9	Dr. Jayasree A. K. Prof. of Community Medicine, Medical College Pariyaram
10	Dr. Joy Elaman Director General, KILA
11	Dr. N. C. Narayanan Professor, IIT, Mumbai
12	Dr. R. V. G. Menon Former Principal Govt. Engg. College, Kannur
13	Dr. Shyjan D. Registrar, Thunchath Ezhuthachan Malayalam University
14	Dr. Suma Vishnudas MSSRF
15	Dr. Terry Machado Former Scientist, NCESS
16	Dr. K. V. Thomas Former Scientist, NCESS
17	Sri. V. G. Gopinathan Former Registrar, IRTC

18	Dr. Lalithambika M. Former Director CSIR - NIIST
19	Prof. P. K. Ravindran Former Deputy Director, Collegiate Education Kerala
20	Prof. V. R. Raghunandanan Former Professor, KAU
21	Dr. N. K. Sasidharan Pillai Rtd. Deputy Director of Fisheries, Govt. of Kerala
22	Director IRTC
23	Director of Research IRTC
24	Registrar IRTC

RESEARCH ADVISORY GROUP Members -2020-21	
Sl. No.	Name and address
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1	Dr. P. S. Harikumar, CWDRM
2	Dr. N. C. Narayanan IIT, Mumbai
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4	Dr. E. Shaji University of Kerala
5	Dr. Kamalakshan Kokkal Formerly KSCSTE
6	Dr. S. Sandeep Scientist, KFRI
7	Dr. K. V. Thomas Former Scientist, NCESS
8	Sri. G. Sankar Former Scientist, NCESS
9	Dr. Terry Machado Former Scientist, NCESS
10	Sri. Edison Former Director, Land use board
11	Sri. Abdul Hameed, IRTC
12	Dr. Jayasuryan
13	Sri. V. R. Raman
14	Ms. Shyni (Jal Sakthi)
15	Dr. Abhilash. S (CUSAT)
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2	Dr. Jiju P Alex, DoR, KAU
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9	Sri. Padmanabhan, NABARD
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5	Dr.M.A. Khader.
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5	T.P.Raghunath
6	Dr. KGK Warriar
7	Dr. Lalithambika IRTC
8	A. K. Mathew
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2	Dr. Joy Elaman, KILA
3	Prof. K. P. Kannan
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6	Prof. T. P. Kunhikkannan
7	Dr. Shyjan Davis
8	Dr.Jafar.K
9	Dr. Binoy Peter
10	Dr. Suma Vishnudas

Financial Statement

SOCIETY FOR INTEGRATED RURAL TECHNOLOGY CENTRE Mundur, Palakkad - 678 592						
BALANCE SHEET AS AT 31 st MARCH, 2021						
LIABILITIES	SCH.	Amount As On	Amount As On	ASSETS	SCH.	Amount As On
		31.03.2021	31.03.2020			31.03.2021
Capital Fund	1	4,60,03,166.81	4,46,44,405.22	Fixed Assets	4	3,10,80,497.00
Project Fund Balances	2	12,25,938.00	3,28,230.40	Advances from General Fund	5	(15,00,769.27)
Current Liabilities & Provisions	3	56,85,364.37	82,46,424.23	Current Assets, Loans & Advances	6	2,33,34,741.45
		5,29,14,469.18	5,32,19,059.85			5,29,14,469.18
						5,32,19,059.85

AUDIT REPORT

As per our Report on even date annexed.

Sd/-
REGISTERAR

Sd/-
DIRECTOR

For Ranjit Karthikeyan
Associates
Chartered Accountants
Firm Regn No: 06705S

Calicut
21-09-2021

Sd/-
T. K. Muralidharan M.Com. FCA
Partner (Mem. No: 211385)
UDIN:

**INTEGRATED RURAL
TECHNOLOGY CENTRE**

ANNUAL REPORT
2020-21



Grant-in-aid institution of
Kerala State Council for
Science, Technology and
Environment (KSCSTE)



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Mundur, Palakkad, Kerala