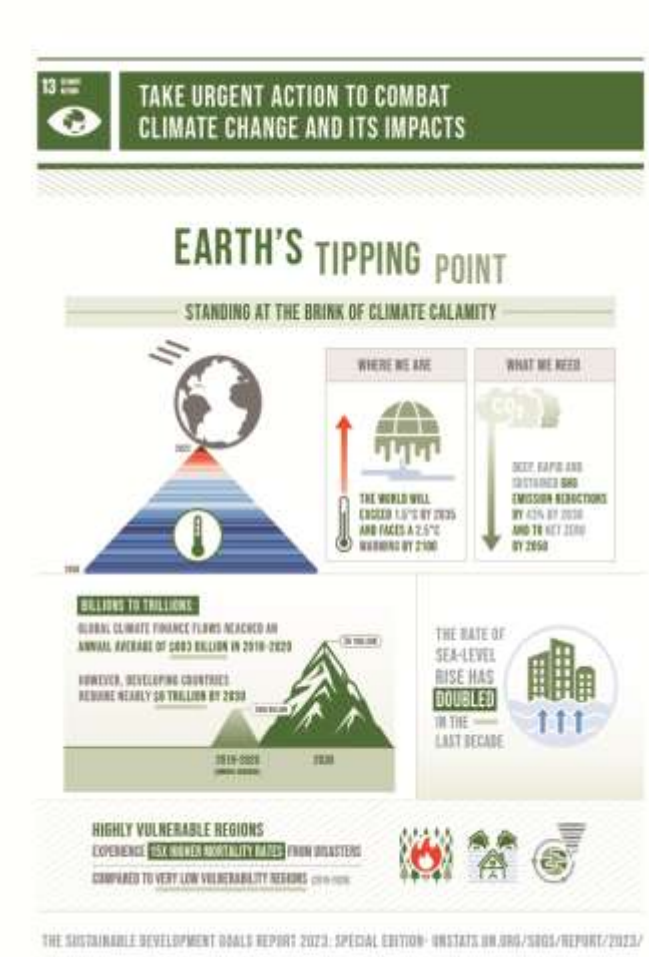
Karunya INSTITUTE OF TECHNOLOGY AND SCIENCES
(Declared as Deemed to be University under Sec.3 of the UGC Act, 1956)
MoE, UGC & AICTE Approved
NAAC A++ Accredited

SDG 13 Climate Action

SDG 13
Climate Action

Preamble

As an institution of higher education and programmes in sciences, engineering, agriculture, management and media, KITS is committed to teach and carry out research, extension and consultancy works in the areas of Sustainable Development Goals.



The 720 acre campus of Karunya with more than 320 acre farm land serves as experimental and demonstration laboratories, and field stations to find eco-friendly solutions to the problems in the areas of global importance and thrust areas of the institution such as Water, Food, Healthcare and Sustainable energy. The Institution's strategies and activities in the above mentioned four thrust areas compels us to work towards mitigation of climate change and adaptation measures.

Most of the Technology missions of KITS also focus on research and demonstration projects relating to the climate change mitigation, in the areas of environmental pollution, natural resources management, ecosystem preservation and biodiversity conservation.

The prevailing challenges in climate action have been recognized by the faculty and students of KITS residing in the Karunya campus for more than a decade

Source: https://sdgs.un.org/goals/goal13

Green Initiatives towards Climate Action:

KITS campus located in the foothills of Western Ghats is known for its floral and faunal biodiversity. Taking up the challenge of conserving the natural resources, ecosystems and biodiversity, KITS is in the process of developing innovative scientific and technological interventions to build a carbon neutral campus. Some of the green initiatives taken by KITS in combating the climate change impacts are: Sewage Treatment Plants, paper recycling unit, vermicomposting yards, solar power plant, biogas plants, solar water heaters, LED lights, Rotary Kiln Gasification Pilot Plant for plastic waste and Salzer energy saver device.

1. Low-Carbon Energy Use (Use of Renewable Energy Sources)

To offset the climatic conditions and to have a sustainable environment, KITS strategizes all its operations considering the issues related to climate and environment. The following green initiatives have been implemented on campus.

- 95 kW Grid tied Solar Power Plant in the administrative block
- 20 kW Grid tied Solar Power Plant in hostels
- Solar water heating system of 85,600 LPD
- 7958 LED Tube lights
- Eco friendly Paper recycling unit
- DST funded Rotary Kiln Gasification Pilot Plant for plastic waste management
- 5 sewage treatment plants

Renewable Energy Sources and Energy Savings:

Solar Power Generation from 95kW Solar Power Plant in Admin Block

Sl.No	Month	Solar Power Generation in kWh
1	Apr'2023	10800
2	May'2023	10500
3	Jun'2023	11610
4	Jul'2023	9460
5	Aug'2023	10770
6	Sep'2023	11230
7	Oct'2023	10710
8	Nov'2023	9600
9	Dec'2023	8840
10	Jan'2024	9100
11	Feb'2024	10030
12	Mar'2024	12120
Generation for Year'2023-2024		**124770**

Solar Power Generation from 20kW Solar Power Plant in EVR/Oprah Mess Building

Sl.No	Year	Solar Power Generation in kWh
1	Apr'2023	2121
2	May'2023	2210
3	Jun'2023	2363
4	Jul'2023	1872
5	Aug'2023	2084
6	Sep'2023	2212
7	Oct'2023	2170
8	Nov'2023	1641
9	Dec'2023	158
10	Jan'2024	2294
11	Feb'2024	2145
12	Mar'2024	2716
Generation for Year'2023-2024		**23986**
Total		**148756 kWh**

Grand Total **= 1545718 + 148756 = 1694474 kWh**

Solar Water Heater- Boys Hostel

95 kW Grid Tied Solar Power Plant in Administrative Block

Details of Renewable Energy Sources (Solar) at KITS

a. 95 kW Grid Tied Solar Power Plant In Main Building

The 95 kW Grid – Tied Solar Power Plant has 312 Poly crystalline solar panels connected through four inverters to the Distribution Board. The power generation is monitored through online monitoring unit from the inverters.

Salient Features of Solar Power Plant:

1. Grid – Tied 95kW Photo Voltaic Poly Crystalline Solar Power Plant
2. 25 kW Capacity of Inverter of 4 Nos – Make – SMA
3. No of Inverters – 4 Nos
4. No of Strings in each Inverter – 4 Nos
5. No of Solar panels connected in each inverter – 84 Panels (Except 4th inverter - 60 Nos)
6. Total No of Modules (Panels) – 312 Nos (Each – 310 Watts) – Make – EMMVEE

b. 20 kW Grid Tied Solar Power Plant in Hostels

Salient Features of Solar Power Plant.

1. Grid – Tied 20kW Photo Voltaic Poly Crystalline Solar Power Plant
2. 25 kW Capacity of Inverter of 1 No – Make – SMA
3. No of Inverters – 1 Nos
4. No of Strings in each Inverter – 4 Nos
5. No of Solar panels connected in each inverter – 66 Panels
6. Total No of Modules (Panels) – 16 Nos (Each – 310 Watts) – Make – EMMVEE

Hostel Specifications	**Angelina Residence**	**Hephzibah Residence**	**Father Duraisamy Residence**	**Edward George Residence**	**New JVR Residence**	**New JMR Residence**	**New BRR Residence**	**New Bethany Residence**
System Model	TWINWALL model Solar system							
Type of Collector	Flat Plate Collector							
System Capacity	3500 Lts per day	2500 Lts per day	3500 Lts per day	2500 Lts per day	3500 Lts per day	3500 Lts per day	3500 Lts per day	3500 Lts per day
No. of Units	2 Units	3 Units	1 Unit	2 Units	2 Units	2 Units	2 Units	2 Units
System Temperature	60®c	60®c	60®c	60®c	60®c	60®c	60®c	60®c
No. of Solar Collectors	1 set, 28 Collectors	1 set, 20 Collectors	1 set, 28 Collectors	1 set, 20 Collectors	1 set, 28 Collectors	1 set, 28 Collectors	1 set, 28 Collectors	1 set, 28 Collectors
Circulation and its Space	Natural Gravity Circulation System Space required 60 m^2 for 3500 LPD System and 45 m^2 for 2500 LPD System							
Application	Hot Water							
Electrical back-up heater	Auxiliary Heating With Electrical Supply of 4 Kw with thermostat							
Tank Capacity	3500 Lts with air vent provision	Tank Capacity	3500 Lts with air vent provision	Tank Capacity	3500 Lts with air vent provision	Tank Capacity	3500 Lts with air vent provision	Tank Capacity

Tank Type	Stainless steel storage tanks insulated with Glass wool Cladded with aluminium, Cage type Stainless steel Heat exchanger
Support stands for tank and collector	Mounted on Concrete floor with steel frame and Anchoring bolts

Hostel	**Sevugapandian Residence**	**Sundararaj Residence**	**P R Garg Residence**	**Dakshinamoorthy Residence**	**Oprah Residence**	**Evangeline Residence**
System Model	VESAT Solar Products					
Type of Collector	Flat Plate Collector					
System Capacity	3500 Lts per day	3500 Lts per day	500 Lts per day	3500 Lts per day	3500 Lts per day	3500 Lts per day
No. of Units	2 Units	2 Units	1 Unit	1 Unit	1 Unit	2 Units
System Temperature	60®c	60®c	60®c	60®c	60®c	60®c
No. of Solar Collectors	1 set, 28 Collectors	1 set, 28 Collectors	1 set, 28 Collectors	1 set, 28 Collectors	1 set, 28 Collectors	1 set, 28 Collectors
Circulation and its Space	Natural Gravity Circulation System Space required 60 m^2 for 3500 LPD System					
Application	Hot Water					
Electrical back-up heater	Auxiliary Heating With Electrical Supply of 4 kW with thermostat					
Tank Capacity	3500 Lts with air vent provision	3500 Lts with air vent provision	3500 Lts with air vent provision	3500 Lts with air vent provision	3500 Lts with air vent provision	3500 Lts with air vent provision
Tank Type	Stainless steel storage tanks insulated with Glass wool Cladded with aluminium, Cage type Stainless steel Heat exchanger					
Support stands for tank and collector	Mounted on Concrete floor with steel frame and Anchoring bolts					

2. Education and Research on Climate Change and Action

To create awareness on the climate change, impacts, mitigation and adaptation, KITS in involved in imparting knowledge through:

- offering courses related to climate change at all levels of education.
- strengthening the research in climate action through creating infrastructure in renewable energy sources such as biomass, solar and wind
- involving faculty and students in technology missions related to the climate
- encouraging research publications though collaborations
- organizing events/workshops/conferences for dissemination of knowledge
- enhancing capacity building through guest lectures

2.1 Education Programme on Climate Action:

- KITS has integrated sustainability related issues in the curriculum by offering 113 courses covering renewable energy sources, sustainable building materials, global climate change, green and smart building across different programmes.
- The campus with 40% greenery has a rich biodiversity serving as a habitat for several indigenous plants endemic to Western Ghats, migratory bird species and a host of insects. Students are introduced to the diversity of flora and fauna through several courses highlighting nature conservation.
- KITS has introduced green solutions for natural resources conservation, rainwater harvesting, sewage treatment, paper recycling, solar energy harnessing, biogas production creating an environment with a target of achieving SDGs.
- Courses on Cleaner Production and Sustainable Development, Renewable Energy and Green Technology and Sustainable Building Concepts and Design are offered to students across disciplines.
- Courses on Natural Resources Management and Environment Conservation is offered by the School of Agriculture and Biosciences. The School offers two courses for UG and PG programs on Climate Change and Environment Conservation namely Agrometeorology and crop weather forecasting and Introductory Agro-Meteorology &Climate Change.
- Students earn non-academic credits for extension activities related to nature clubs in the areas of water, solid waste management, environment, green campus and community health.

a. Infrastructure Facilities in Renewable Energy Sources such as Biomass, Solar and Wind

2.2. 1 National Aeronautics and Space Administration (NASA) has set up an "AERONET" (AErosol RObotic NETwork) station at KITS to study the air quality of Western Ghats. The University signed an agreement with the Office of International and Interagency Relations, NASA. The project is managed by NASA's Goddard Space Flight Center.

2.2.2 Agrometeorology Observatory

KITS has installed a Class-B Meteorology Observatory and Automatic Weather Station (AWS) that monitors global solar irradiance, sunshine recorder, rainfall, air temperature, soil

temperature at different depths, relative humidity, soil moisture, wind speed, wind direction data, as well as photosynthetic active radiation and leaf wetness, which are critical for research and development. The recorded meteorological data contributes towards research and development under SDG-13.

2.2.3 KITS has the state -of-the-art Model facility- **Rotary Kiln Gasification Pilot Plant** for converting plastic waste into a source of energy. In collaboration with industry partner, Techurja Inc., KITS has unlocked the potential of plastic through groundbreaking processes.

2.2.4 Solar and Wind Energy Laboratory

- PV Module characterization kit to study the effect of different angular positions, I-V Characteristics at different electrical connections.
- PV System characterization kit to study the efficiency of the whole PV System by studying the efficiency of individual unit.
- Solar Simulator (solar cell characterization unit) to study the dependency of solar cell output on light intensity and temperature.

2.2.4 **Wind Tunnel Experimental Set-up**

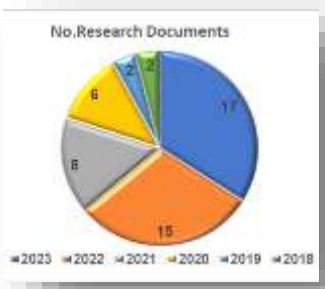
- Two wind tunnels with artificial wind generation.
- Small Wind Turbines can be tested for various wind speed profiles.
- Power Generation and Efficiency of wind turbines can be tested.
- Maximum power tracking from wind turbine power curve.

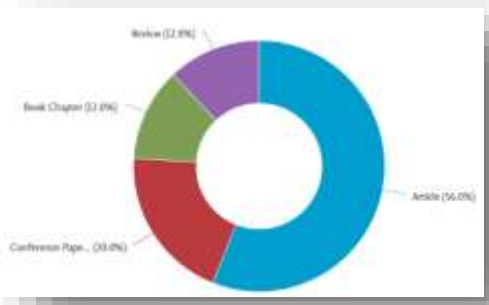
2.2.5 Eco-Friendly Paper Recycling Unit

2.2.6 Sewage Treatment Plants

2.3 Research on Climate Action and Publication : For more than a decade, KITS is involved in research activities related to climate change, mitiagation and adaptation through 10 Technology Missions (Wetland Conservation Mission, Drone Technology for Agricultural Mission, Smart Technology for Precision Farming, Green and Sustainable Manufacturing, Green Energy Technology Mission, Technology Mission for Food Security, Smart Intelligent Building Mission, Smart Vehicle Mission, Satellite and GIS Application Mission, Smart City Mission).

58 research documents (articles, books, conference and review papers) have been published by the faculty and students of KITS related to SDG 13 in collaboration with 18 countries and





with around 95 other academic and research institutions. Since the inception of SDGs in 2018,

there is increase in publication of research documents from 2 in the year 2018 to 17 in the year 2023. This depicts the inolvement of KITS in climate action.The details of the publications are as follows:

Sl.No	Title	Authors	Year	Scopus Source title	Citations
1	Advancement in algal bioremediation for organic, inorganic, and emerging pollutants	Dubey, S.| Chen, C.-W.| Haldar, D.| Tambat, V.S.| Kumar, P.| Tiwari, A.| Singhania, R.R.| Dong, C.-D.| Patel, A.K.	2023	Environmental Pollution	48
2	Emissions of black carbon and polycyclic aromatic hydrocarbons: Potential implications of cultural practices during the Covid-19 pandemic	Kurwadkar, S.| Kumar Sankar, T.| Kumar, A.| Ambade, B.| Gautam, S.| Sagar Gautam, A.| Biswas, J.K.| Abdus Salam, M.	2023	Gondwana Research	34
3	Engineering properties, sustainability performance and life cycle assessment of high strength self-compacting geopolymer concrete composites	Kanagaraj, B.| Anand, N.| Johnson Alengaram, U.| Samuvel Raj, R.	2023	Construction and Building Materials	30
4	Black Carbon Emissions from Traffic Contribute Sustainability to Air Pollution in Urban Cities of India	Hussain, A.J.| Sankar, T.K.| Vithanage, M.| Ambade, B.| Gautam, S.	2023	Water, Air, and Soil Pollution	30
5	Genetic manipulation of anti-nutritional factors in major crops for a sustainable diet in future	Duraiswamy, A.| Sneha A, N.M.| Jebakani K, S.| Selvaraj, S.| Pramitha J, L.| Selvaraj, R.| Petchiammal K, I.| Kather Sheriff, S.| Thinakaran, J.| Rathinamoorthy, S.| Kumar P, R.	2023	Frontiers in Plant Science	28
6	Physical characteristics and	Kanagaraj, B.| Anand, N.| Praveen,	2023	Developments in the Built	25

	mechanical properties of a sustainable lightweight geopolymer based self-compacting concrete with expanded clay aggregates	B.| Kandasami, S.| Lubloy, E.| Naser, M.Z.		Environment	
7	Techno-socio-economic aspects of Portland cement, Geopolymer, and Limestone Calcined Clay Cement (LC3) composite systems: A-State-of-Art-Review	Kanagaraj, B.| Anand, N.| Samuvel Raj, R.| Lubloy, E.	2023	Construction and Building Materials	22
8	Influence of elevated temperature exposure on the interfacial shear strength capacity of binary blended high strength self-compacting geopolymer concrete	Kanagaraj, B.| Anand, N.| Raj R, S.| Lukose, J.| Andrushia, D.| Lubloy, E.	2023	Case Studies in Construction Materials	15
9	Purification of biogas for methane enrichment using biomass-based adsorbents: A review	Haldar, D.| Bhattacharjee, N.| Shabbirahmed, A.M.| Anisha, G.S.| Patel, A.K.| Chang, J.-S.| Dong, C.-D.| Singhania, R.R.	2023	Biomass and Bioenergy	12
10	Micro- to macro-scaling analysis of PM2.5 in sensitive environment of Himalaya, India	Kimothi, S.| Chilkoti, S.| Rawat, V.| Thapliyal, A.| Gautam, A.S.| Gautam, S.	2023	Geological Journal	10
11	Axial compressive behaviour and physical characteristics of high strength self-compacting geopolymer concrete (HSGC) columns exposed to elevated temperature	Kanagaraj, B.| Anand, N.| Jerry, R.| Samuvel Raj, R.| Lubloy, E.	2023	Construction and Building Materials	6
12	Black Carbon vs Carbon Monoxide:	Ambade, B.| Sankar, T.K.|	2023	Water, Air, and Soil Pollution	5

	Assessing the Impact on Indian Urban Cities	Gautam, S.| Mahato, D.K.| Dumka, U.C.| Mohammad, F.| Al-Lohedan, H.A.| Soleiman, A.A.| Gautam, A.S.			
13	Synthesis and electrochemical evaluation of porous carbon derived from sanitary pad waste for high performance in symmetric supercapacitor application	Wesley, R.J.| Sowmya, S.| Durairaj, A.| Justinabraham, R.| Vijaikanth, V.| Obadiah, A.| Vasanthkumar, S.	2023	Journal of Energy Storage	5
14	A Comprehensive Review on Optimization and Artificial Intelligence Algorithms for Effective Battery Management in EVs	Manoj, D.| Josh, F.T.	2023	International Journal of Electrical and Electronic Engineering and Telecommunications	4
15	Impact of COVID-19 on Black Carbon and Carbon Monoxide Levels and Its Health Risk Assessment Over East India	Sankar, T.K.| Kumar, A.| Ambade, B.| Mahato, D.K.| Hussain, A.J.| Sethi, S.S.| Mohammad, F.| Soleiman, A.A.| Gautam, S.	2023	Aerosol Science and Engineering	3
16	Xylitol Production from Corncob Hydrolysate by an Engineered Escherichia coli M15 as Whole-Cell Biocatalysts	Ariyan, M.| Thankappan, S.| Ramachandran, P.| Uthandi, S.	2023	Waste and Biomass Valorization	2
17	Design and Evaluation of a Photobioreactor for Carbo Capture and Mitigation Using Microalgae	Adhithya, S.| Thomas, J.| Aravinthkumar, V.	2023	International Journal on Algae	1
18	Effect of Urbanism on Land Surface Temperature (LST) in a River Basin and an Urban	Brema, J.| Alsalmi, A.K.| Mayilswami, C.| Thinakaran, J.	2023	Springer Climate	1

	Agglomeration				
19	Finite State Machine-Based Load Scheduling Algorithm for Smart Home Energy Management	Merlin Sajini, M.L.| Suja, S.| Merlin Gilbert Raj, S.| Kowsalyadevi, S.| Maria, C.	2023	IETE Journal of Research	1
20	A comprehensive review on electric vehicles: Charging and control techniques, electric vehicle-grid integration	Femy, P.H.| Jayakumar, J.	2023	Energy Harvesting and Systems	1
21	Mathematical Modelling of Banana Slices in Natural Convection Indirect Solar Dryer	Monicka, A.A.| Kumar, D.| Solomon, A.B.| Suguna Devekumari, M.	2023	E3S Web of Conferences	1
22	Characterization of little millet (Panicum sumatrense Roth. ex. Roem. and Schultz) landraces and varieties for genetic diversity and association of traits	Selvaraj, S.| Sneha, A.N.M.| Pramitha, J.L.| Petchiammal, K.I.| Wilson, D.| Kumar, P.D.| Francis, N.| Sheriff, S.K.	2023	Electronic Journal of Plant Breeding	1
23	Machine Learning, Deep Learning Models for Agro-Meteorology Applications	Jala, P.K.| Meenal, R.| Nagabushanam, P.| Selvakumar, A.I.| Jude Hemanth, D.| Rajasekaran, E.	2023	ICSPC 2023 - 4th International Conference on Signal Processing and Communication	1
24	Foxtail millet (Setaria italica L.)	Pramitha, L.| Choudhary, P.| Rana, S.| Singh, R.K.| Das, P.| Sharma, S.| Rajasekaran, R.| Prasad, M.| Muthamilarasan, M.	2023	Neglected and Underutilized Crops: Future Smart Food	0
25	NANOFLUIDS IN PRODUCTION OF SUSTAINABLE BIOFUELS AND BIOPLASTICS	Vezhavendhan, R.| Kanakavalli, P.B.| Arigela, S.H.| Chandrashekhar, A.| Sathish, R.| Joshi, S.K.| Isaac, J.S.	2023	Oxidation Communications	0

26	Synthesis of nanoengineered microporous activated carbon from Nerium Oleander fruit seeds for the adsorptive removal of carbon dioxide (CO2)	Pandey, P.| Kansal, A.| Dhiman, M.| Subudhi, S.P.| Gautam, A.S.| Gautam, S.	2023	Environment, Development and Sustainability	0
27	REDUCTION OF CARBON FOOTPRINT WITH GEOPOLYMERIC CONCRETE AND RECYCLED AGGREGATE – A CRITICAL REVIEW	Kanakaraj, V.| Christy, C.E.F.	2023	Malaysian Construction Research Journal	0
28	Optimization of low-grade coal and refuse-derived fuel blends for improved co-combustion behavior in coal-fired power plants	Zaib, Q.| Park, S.| Behera, S.K.| Mahanty, B.| Zafar, M.| Park, H.-S.| Kyung, D.	2023	Environmental science and pollution research international	0
29	Energy Consumption of Composite Structure in Various Regions in India: A BIM Approach	Arun Kumar, B.| Daniel, C.| Amudhan, V.| Devarajan, S.| Tahara, R.M.K.| Arunraj, E.| Arun Solomon, A.	2023	Civil Engineering and Architecture	0
30	The importance of tropics in the changing climate	Rajan, D.| Gautam, S.	2023	The Role of Tropics in Climate Change: Global Case Studies	0
31	Production of bioethanol from food waste: Status and perspectives	Singh, A.| Singhania, R.R.| Soam, S.| Chen, C.-W.| Haldar, D.| Varjani, S.| Chang, J.-S.| Dong, C.-D.| Patel, A.K.	2022	Bioresource Technology	71
32	Exemplification of sustainable sodium silicate waste sediments as coarse aggregates in the performance evaluation of	Kanagaraj, B.| Anand, N.| Johnson Alengaram, U.| Samuvel Raj, R.| Kiran, T.	2022	Construction and Building Materials	40

	geopolymer concrete				
33	Comprehensive Assessment of Electric Vehicle Development, Deployment, and Policy Initiatives to Reduce GHG Emissions: Opportunities and Challenges	Paul Sathiyan, S.| Benin Pratap, C.| Stonier, A.A.| Peter, G.| Sherine, A.| Praghash, K.| Ganji, V.	2022	IEEE Access	40
34	Addressing the relevance of COVID–19 pandemic in nature and human socio-economic fate	Thapliyal, J.| Bhattacharyya, M.| Prakash, S.| Patni, B.| Gautam, S.| Gautam, A.S.	2022	Stochastic Environmental Research and Risk Assessment	14
35	Strength and microstructure behaviour of high calcium fly ash based sustainable geo polymer concrete	Vijaya Prasad, B.| Paul Daniel, A.P.| Anand, N.| Yadav, S.K.	2022	Journal of Engineering, Design and Technology	13
36	High-Altitude Air Pollutants Monitored from Rainwater Chemistry in the Central Himalaya	Bisht, D.S.| Srivastava, A.K.| Singh, V.| Tiwari, S.| Gautam, A.S.| Gautam, S.| Santosh, M.| Kumar, S.	2022	Water, Air, and Soil Pollution	13
37	Assessing the impacts of human interventions and climate change on fluvial flooding using CMIP6 data and GIS-based hydrologic and hydraulic models	Mahato, P.K.| Singh, D.| Bharati, B.| Gagnon, A.S.| Singh, B.B.| Brema, J.	2022	Geocarto International	10
38	Synergistic Modulation of Seed Metabolites and Enzymatic Antioxidants Tweaks Moisture Stress Tolerance in Non-Cultivated Traditional Rice Genotypes during Germination	Binodh, A.K.| Thankappan, S.| Ravichandran, A.| Mitra, D.| Alagarsamy, S.| Panneerselvam, P.| Senapati, A.| Sami, R.| Al-Mushhin, A.A.M.| Aljahani, A.H.| Alyamani, A.| Alqurashi, M.	2022	Plants	8
39	A Novel Approach	Chowdary, V.T.|	2022	Proceedings of	7

	for Effective Crop Production using Machine Learning	Robinson Joel, M.| Ebenezer, V.| Edwin, B.| Thanka, R.| Jeyaraj, A.		the International Conference on Electronics and Renewable Systems, ICEARS 2022	
40	Multi-omics intervention in Setaria to dissect climate-resilient traits: Progress and prospects	Aggarwal, P.R.| Pramitha, L.| Choudhary, P.| Singh, R.K.| Shukla, P.| Prasad, M.| Muthamilarasan, M.	2022	Frontiers in Plant Science	6
41	Fuel vehicle improvement using high voltage gain in DC-DC boost converter	Jarin, T.| Akkara, S.| Sreeja Mole, S.S.| Manivannan, A.| Immanuel Selvakumar, A.	2022	Renewable Energy Focus	6
42	Optimization of Performance and Emission Characteristics of Biodiesel from Non-Edible Raphanus sativus Oil with Nano-Additive	Chokkalingam, S.| Chandrasekaran, K.| Pandian, S.| Asir, O.	2022	Theoretical Foundations of Chemical Engineering	5
43	Enhancement of opto-electrical properties in Co doped CdS–TiO2 nanocomposite thin film as photoanode for Semiconductor Sensitized Solar Cells (SSSCs)	Jostar, S.T.| Devadason, S.| Arputhavalli, G.J.| Jebasingh, S.| Suthagar, J.	2022	Physica E: Low-Dimensional Systems and Nanostructures	5
44	Experimental Investigation on Fresh and Hardened Properties of High Calcium Flyash Based Geopolymer Concrete	Vijaya, P.B.| Arun, K.P.| Anand, N.| Arumairaj, P.D.| Dhilip, T.| Kumar, M.S.	2022	Materials Science Forum	4
45	An Extensive Critique on Electric Vehicle Components and Charging Systems	Iqubal, M.| Sathiyan, P.| Stonier, A.A.| Peter, G.| Vanaja, D.S.| Ganji, V.	2022	International Transactions on Electrical Energy Systems	4
46	Prospects of	John, N.| Shanthi,	2022	Civil	3

	Metakaolin Admixed Palm Kernel Shell Solid Concrete Masonry Block: A Review	R.M.| Tensing, D.		Engineering and Architecture	
47	Wind Turbine Energy Cost Optimisation Using Various Power Models	Divya, P.S.| Moses, V.| Manoj, G.| Lydia, M.	2022	WSEAS Transactions on Power Systems	2
48	Impact of electric vehicles in smart grids and micro-grids	Thomas, T.| Michael, P.A.| Joy, A.	2022	Smart Grids and Microgrids: Technology Evolution	2
49	Global implications of biodiversity loss on pandemic disease: COVID-19	Brema, J.| Gautam, S.| Singh, D.	2022	COVID-19 and the Sustainable Development Goals	2
50	Integrating Genomics and Phenomics Tools to Dissect Climate Resilience Traits in Small Millets	Pramitha, L.| Choudhary, P.| Das, P.| Sharma, S.| Karthi, V.| Vemuri, H.| Muthamilarasan, M.	2022	Omics of Climate Resilient Small Millets	2
51	Changing Patterns in the Spread of Human Monkeypox: A Dangerous New Development in Disease Epidemiology	Chandran, D.| Hridya, P.| Prasanth, D.| Abernaa, D.| Kaaviya, A.V.| Menon, P.S.S.| Vinodhini, D.| Aslam, M.K.M.| Pran, M.| Savanth, V.V.| Nainu, F.| Yatoo, M.I.| Ur Rehman, M.E.| Chopra, H.| Emran, T.B.| Dey, A.| Sharma, A.K.| Dhama, K.	2022	Journal of Pure and Applied Microbiology	2
52	An Efficacy of Covid - 19 Pandemic: Recovery of Workplace Environment and Ecosystem	Sivaprakash, P.| Kanchana, S.| Venkataramanan, P.| Michael, P.A.	2022	International Journal of Occupational Safety and Health	1
53	Microarray-Based Detection and Identification of	Sinha, A.| John, J.| Singh, S.| Johri, P.	2022	Microorganisms for Sustainability	1

	Bacterial and Viral Plant Pathogens				
54	Beneficial health effects of cumin (Cuminum cyminum) seeds upon incorporation as a potential feed additive in livestock and poultry: A mini-review	Vinod, N.| Sreelakshmi, K.S.| Neha, A.R.| Soman, M.| Manalil, S.| Sureshkumar, R.| Sabareeshwari, V.| Naveen Kumar, P.| Kumar, K.K.| Sangeetha, K.S.| Lishma, N.P.| Pran, M.| Sharma, A.K.| Alagawany, M.| Dhama, K.| Marthandan, V.| Chandran, D.	2022	Journal of Experimental Biology and Agricultural Sciences	1
55	Enhancement of energy efficient distribution generation integrated with solid state transformer using improved rider optimization algorithm	Saju, N.| Jegathesan, V.	2022	Australian Journal of Electrical and Electronics Engineering	0
56	Estimation of daily evapotranspiration rate for coimbatore region using ANN modeling technique	Swathi, S.| Mary, X.A.| Subathra, M.S.P.| Abel, T.| S. Thomas, G.	2022	AIP Conference Proceedings	0
57	Machine Learning-Based Management of Hybrid Energy Storage Systems in e-Vehicles	Blessie, E.C.| Jagnannathan, S.K.| Krishna, B.V.| David, D.B.| Maheswari, R.| Pavithra, M.| Raj, P.A.| Paramasivam, S.| Prasad, V.R.R.	2022	Journal of Nanomaterials	0
58	Drip Fertigation with Fertilizer Prescription Through STCR—IPNS—A Way Forward Towards Climate Change Mitigation	Rangasamy, S.| Subramaniyam, M.| Stephen, P.K.| Dey, P.	2022	Lecture Notes in Civil Engineering	0

2.4 Capacity Building Activities:

To enhance the knowledge on climate change impacts, mitigation and adaptation and to build capacity, nine national and international seminars, experience sharing workshops, conferences and training programmes were conducted.

2.4.1 A Two-day event on the theme of 'Climate Change' and 'Sustainable Agriculture'

Karunya Technology Business Incubation Park (KTBIP) and the School of Agricultural Sciences organized A Two-day event on the theme of 'Climate Change' and 'Sustainable Agriculture' with a view to commemorate India's G20 Presidency and its theme, 'Vasudhaiva Kutumbakam' (One Earth One Family), with a focus on sustainable and environment-friendly lifestyles during May 10th and 11th, 2023. The event showcased the creative endeavors of the students of B.Sc. (Hons) Agriculture, with a focus on the theme 'Climate Change - causes, impacts, and mitigation'. The exhibits were in the form of models, charts, paintings, presentations, blogs, and vlogs, highlighting the importance of sustainable agriculture and its impact on the environment.

The students displayed various products, methodologies, farming practices, cultivars, and artefacts. These products included herbal products, bio-fertilizers, vermin compost, souvenirs based on dry leaves, seedlings, and plantings.

2.4.2 International Conference on 'Integrated Water Resources Management: Prospects and Challenges'

Karunya Institute of Technology and Sciences, Coimbatore organized an International Conference on "Integrated Water Resources Management: Prospects and Challenges" from 8 to 9th December 2022 sponsored by the Ministry of Jal Sakthi, Govt. of India. The conference delibrated upon the themes of hydrology, geospatial techniques, application of IoT and AI in water resources management, agriculture, water quality, water treatment technologies, wetland ecology, decision support system, water conservation and groundwater recharge, the impact of climate change on water resources, water economics, governance, policies and capacity

building. A total of 4 keynote lectures and 6 theme papers were presented. Around 120 papers were presented in 12 technical sessions.

2.4.3 Water Summit

KITS organized Water Summit India 2022 on 18th September 2022. Renowned experts in the field of water technology deliberated and prepared the Water Vision document for Coimbatore. Twenty renowned experts from across the country representing diverse academic and research organizations, industry, Government and NGO outfits participated in the Water Summit. The Vision Document was prepared highlighting innovative, novel and practical

suggestions for facing the challenges in the water sector of different hydro-ecological zones of India. This will help to combat the climate change impacts

KITS has a policy on Mitigating the Impact on Climate and the Environment which has been posted in the website for public. Link: https://www.karunya.edu/iqac/sustainability