



SDG12 – Consumption and Production (Waste Management System)

Karunya Institute of Technology and Sciences (KITS) follows the principle of 3Rs (Reduce, Reuse and Recycle) model to address the challenges of waste management in its 720 acre campus. Being a residential campus with 7625 students in 15 resident halls (hostels) and 661 faculty/staff members, many of whom reside on campus in the 17 apartment complexes, the 3R model is effective in dealing with the different types of waste namely; solid, liquid and e-waste. KITS is committed to promoting sustainability and corporate social responsibility through the effective management of its solid waste and grey water. The waste management system of KITS includes:

- Solid waste management
- Liquid waste management
- E-waste management

In this domain 76 papers were published in the Scopus/WoS Indexed Journals and list is furnished:

| Sl.No. | Title | Authors | Year | Journal | Volume | Issue |
|---------------|---|--|-------------|---|---------------|--------------|
| 1 | Inconsistencies of e-waste management in developing nations – Facts and plausible solutions | Gollakota, A.R.K. Gautam, S. Shu, C.-M. | 2020 | Journal of Environmental Management | 261 | - |
| 2 | SARS-CoV-2 in wastewater: Challenges for developing countries | Pandey, D. Verma, S. Verma, P. Mahanty, B. Dutta, K. Daverey, A. Arunachalam, K. | 2021 | International Journal of Hygiene and Environmental Health | 231 | - |
| 3 | IoT-enabled solid waste management in smart cities | Vishnu, S. Jino Ramson, S.R. Senith, S. Anagnostopoulos, T. Abu-Mahfouz, A.M. Fan, X. Srinivasan, S. Kirubaraj, A.A. | 2021 | Smart Cities | 4 | 3 |

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|---|---|---|------|---|-----|---|
| 4 | Post-fire damage assessment and capacity based modeling of concrete exposed to elevated temperature | Thanaraj, D.P. Anand, N. Prince Arulraj, G. Zalok, E. | 2020 | International Journal of Damage Mechanics | 29 | 5 |
| 5 | Excellent Photocatalytic degradation of Methylene Blue, Rhodamine B and Methyl Orange dyes by Ag-ZnO nanocomposite under natural sunlight irradiation | R., S. Jebasingh, J.A. S., M.V. Stanley, P.K. Ponmani, P. Shekinah, M.E. Vasanthi, J. | 2021 | Optik | 231 | - |
| 6 | Characteristics of expanded polystyrene (EPS) and its impact on mechanical and thermal performance of insulated concrete form (ICF) system | Arun Solomon, A. Hemalatha, G. | 2020 | Structures | 23 | - |
| 7 | Production of bioethanol from food waste: Status and perspectives | Singh, A. Singhanian, R.R. Soam, S. Chen, C.-W. Halder, D. Varjani, S. Chang, J.-S. Dong, C.-D. Patel, A.K. | 2022 | Bioresource Technology | 360 | - |
| 8 | Advanced technologies on the sustainable approaches for conversion of organic waste to valuable bioproducts: Emerging circular bioeconomy perspective | Ashokkumar, V. Flora, G. Venkatkarthick, R. SenthilKannan, K. Kuppam, C. Mary Stephy, G. Kamyab, H. Chen, W.-H. Thomas, J. Ngamcharussrivichai, C. | 2022 | Fuel | 324 | - |
| 9 | Exemplification of sustainable sodium silicate waste sediments as coarse aggregates in the performance evaluation of geopolymer concrete | Kanagaraj, B. Anand, N. Johnson Alengaram, U. Samuvel Raj, R. Kiran, T. | 2022 | Construction and Building Materials | 330 | - |

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|----|--|--|------|---|-----|---|
| 10 | Green production of silica nanoparticles from maize stalk | Adebisi, J.A. Agunsoye, J.O. Bello, S.A. Haris, M. Ramakokovhu, M.M. Daramola, M.O. Hassan, S.B. | 2020 | Particulate Science and Technology | 38 | 6 |
| 11 | An IoT-based bin level monitoring system for solid waste management | Ramson, S.R.J. Moni, D.J. Vishnu, S. Anagnostopoulos, T. Kirubaraj, A.A. Fan, X. | 2021 | Journal of Material Cycles and Waste Management | 23 | 2 |
| 12 | The bond strength of self-compacting concrete exposed to elevated temperature | Mathews, M.E. Anand, N. Kodur, V.K.R. Arulraj, P. | 2021 | Proceedings of the Institution of Civil Engineers: Structures and Buildings | 174 | 9 |
| 13 | Microbial disease management in agriculture: Current status and future prospects | Lindsey, A.P.J. Murugan, S. Renitta, R.E. | 2020 | Biocatalysis and Agricultural Biotechnology | 23 | - |
| 14 | Performance evaluation of sodium silicate waste as a replacement for conventional sand in geopolymer concrete | Kanagaraj, B. Anand, N. Raj R, S. Lubloy, E. | 2022 | Journal of Cleaner Production | 375 | - |
| 15 | Spatio-temporal estimates of solid waste disposal in an urban city of India: A remote sensing and GIS approach | Gautam, S. J., B. R., D. | 2020 | Environmental Technology and Innovation | 18 | - |
| 16 | Investigation on engineering properties and micro-structure characteristics of low strength and high strength geopolymer composites subjected to standard temperature exposure | Kanagaraj, B. Anand, N. Andrushia, A.D. Lubloy, E. | 2022 | Case Studies in Construction Materials | 17 | - |

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|----|---|---|------|--|-----|---|
| 17 | A LoRaWAN IoT-Enabled Trash Bin Level Monitoring System | Ramson, S.R.J. Vishnu, S. Kirubaraj, A.A. Anagnostopoulos, T. Abu-Mahfouz, A.M. | 2022 | IEEE Transactions on Industrial Informatics | 18 | 2 |
| 18 | Understanding the management of household food waste and its engineering for sustainable valorization- A state-of-the-art review | Haldar, D. Shabbirahmed, A.M. Singhania, R.R. Chen, C.-W. Dong, C.-D. Ponnusamy, V.K. Patel, A.K. | 2022 | Bioresource Technology | 358 | - |
| 19 | An improved enzymatic pre-hydrolysis strategy for efficient bioconversion of industrial pulp and paper sludge waste to bioethanol using a semi-simultaneous saccharification and fermentation process | Dey, P. Rangarajan, V. Nayak, J. Das, D.B. Wood, S.B. | 2021 | Fuel | 294 | - |
| 20 | Worn Surface Morphological Characterization of NaOH-Treated Chopped Abaca Fiber Reinforced Epoxy Composites | Kurien, R.A. Selvaraj, D.P. Koshy, C.P. | 2021 | Journal of Bio-and Tribo-Corrosion | 7 | 1 |
| 21 | Sugarcane bagasse into value-added products: a review | Shabbirahmed, A.M. Haldar, D. Dey, P. Patel, A.K. Singhania, R.R. Dong, C.-D. Purkait, M.K. | 2022 | Environmental Science and Pollution Research | - | - |
| 22 | Assessing suitability of commercial fibre reinforced plastic solar still for sustainable potable water production in rural India through detailed energy-exergy-economic analyses and environmental impacts | Sharon, H. Prabha, C. Vijay, R. Niyas, A.M. Gorjian, S. | 2021 | Journal of Environmental Management | 295 | - |

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| 23 | Sinaptic acid safeguards cardiac mitochondria from damage in isoproterenol-induced myocardial infarcted rats | Stanely Mainzen Prince, P. Dey, P. Roy, S.J. | 2020 | Journal of Biochemical and Molecular Toxicology | 34 | 10 |
| 24 | Investigation on improving the residual mechanical properties of reinforcement steel and bond strength of concrete exposed to elevated temperature | Kiran, T. Anand, N. Mathews, M.E. Kanagaraj, B. Andrushia, A.D. Lubloy, E. G, J. | 2022 | Case Studies in Construction Materials | 16 | - |
| 25 | Performance evaluation on engineering properties of sodium silicate binder as a precursor material for the development of cement-free concrete | Kanagaraj, B. Anand, N. Samuvel Raj, R. Lubloy, E. | 2022 | Developments in the Built Environment | 12 | - |
| 26 | Performance of Sustainable Insulated Wall Panels with Geopolymer Concrete | Kanagaraj, B. Kiran, T. Gunasekaran, J. Nammalvar, A. Arulraj, P. Gurupatham, B.G.A. Roy, K. | 2022 | Materials | 15 | 24 |
| 27 | Influence of mineral admixtures on the residual mechanical properties and durability characteristics of self-compacting concrete subjected to high temperature | Kiran, T. Mathews, M.E. N, A. Alengaram, U.J. Andrushia, A.D. | 2022 | Australian Journal of Civil Engineering | 20 | 2 |
| 28 | Effect of protective coating on axial resistance and residual capacity of self-compacting concrete columns exposed to standard fire | Ealiyas Mathews, M. Kiran, T. Anand, N. Lubloy, E. Naser, M.Z. Prince Arulraj, G. | 2022 | Engineering Structures | 264 | - |

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|----|---|---|------|--|------|----|
| 29 | Drought assessment in paddy rice fields using remote sensing technology towards achieving food security and SDG2 | Shams Esfandabadi, H. Ghamary Asl, M. Shams Esfandabadi, Z. Gautam, S. Ranjbari, M. | 2022 | British Food Journal | 124 | 12 |
| 30 | Current perspective on improved fermentative production and purification of fungal cellulases for successful biorefinery applications: a brief review | Dey, P. Rangarajan, V. Singh, J. Nayak, J. Dilip, K.J. | 2022 | Biomass Conversion and Biorefinery | 12 | 3 |
| 31 | Effect of elevated temperature on interfacial shear transfer capacity of self-compacting concrete | Mathews, M.E. Anand, N. Lublóy, É. Kiran, T. | 2021 | Case Studies in Construction Materials | 15 | - |
| 32 | Derivation of synthetic fuel from waste plastic: investigation of engine operating characteristics on DI diesel engine | Rajamohan, S. Marshal, J.J. Suresh, S. | 2021 | Environmental Science and Pollution Research | 28 | 10 |
| 33 | Studies on mechanical properties of high calcium fly ash based sustainable geopolymer concrete | Vijaya Prasad, B. Anand, N. Arumairaj, P.D. Kumar, M.S. Dhilip, T. Srikanth, G. | 2021 | Journal of Physics: Conference Series | 2070 | 1 |
| 34 | Influence of fibers on fresh properties and compressive strength of geopolymer concrete | Vijaya Prasad, B. Anand, N. Kiran, T. Jayakumar, G. Sohliya, A. Ebenezer, S. | 2022 | Materials Today: Proceedings | 57 | - |
| 35 | Rheological and mechanical characterization of self-compacting concrete with utilization of supplementary sustainable cementitious materials | Ealiyas Mathews, M. Anand, N. Prince Arulraj, G. Kiran, T. | 2020 | IOP Conference Series: Earth and Environmental Science | 491 | 1 |

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| 36 | Influence of fiber on shear behavior of concrete exposed to elevated temperature | Varghese, A. Anand, N. Arulraj, P.G. | 2020 | International Journal of Engineering, Transactions A: Basics | 33 | 10 |
| 37 | Development and strength assessment of sustainable high strength fiber reinforced concrete | Jayakumar, G. Mathews, M.E. Kiran, T. Yadav, B.S.K. Kanagaraj, B. Anand, N. | 2021 | Materials Today: Proceedings | 49 | - |
| 38 | Recent Advancements of Supercapacitor Electrode Materials Derived From Agriculture Waste Biomass | Rumjit, N.P. Thomas, P. Lai, C.W. Wong, Y.H. George, V. Basilraj, P. Johan, M.R.B. | 2022 | Encyclopedia of Energy Storage: Volume 1-4 | 1-4 | - |
| 39 | Post-fire behaviour and improving the performance of hot rolled open sections subjected to standard fire exposure | Kiran, T. Anand, N. Mathews, M.E. Andrushia, A.D. Walls, R. Kanagaraj, B. lubloy, E. | 2022 | Case Studies in Construction Materials | 16 | - |
| 40 | Study on fresh and mechanical properties for different grades of geopolymer concrete with recycled coarse aggregate | Vinay Kumar, V. Bhikshma, V. Vijaya Prasad, B. | 2022 | Materials Today: Proceedings | 60 | - |
| 41 | Bio efficacy assay of laccase isolated and characterized from trichoderma viride in biodegradation of low density polyethylene (LDPE) and textile industrial effluent dyes | Johnnie, D.A. Issac, R. Prabha, M.L. | 2021 | Journal of Pure and Applied Microbiology | 15 | 1 |

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| 42 | Dairy Waste Management: A Narrative Review on Current Knowledge | Anand, T.S. Vahab, H. Chandran, D. Shanavas, A. Kumar, M. Nainu, F. Bagath, M. Mohankumar, P. Mohapatra, R.K. Chakraborty, S. Alagawany, M. Dhama, K. | 2022 | Indian Veterinary Journal | 99 | 8 |
| 43 | Investigation on Crack Control and Crack Pattern Analysis of Self-compacting Concrete Exposed to Standard Fire Exposure | Mathews, M.E. Anand, N. Andrushia, A.D. Kiran, T. | 2021 | RILEM Bookseries | 31 | - |
| 44 | Structural response of self-compacting concrete beams under elevated temperature | Mathews, M.E. Andrushia, A.D. Kiran, T. Yadav, B.S.K. Kanagaraj, B. Anand, N. | 2021 | Materials Today: Proceedings | 49 | - |
| 45 | Flexural behavior of fire damaged self-compacting concrete beams strengthened with fiber reinforced polymer (FRP) wrapping | Mathews, M.E. N, A. A, D.A. Kiran, T. Al-Jabri, K. | 2021 | Journal of Structural Fire Engineering | 12 | 4 |
| 46 | 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. Dhillip, T. Kumar, M.S. | 2022 | Materials Science Forum | 1048 | - |
| 47 | Ensuring Sustainability via Application of Root Zone Technology in a Rubber Product Industry: A Circular Economy Approach | C, G. Jacob, L. Gautam, S. Singh, N.K. Kumar, R.P. | 2022 | Sustainability (Switzerland) | 14 | 19 |
| 48 | Biodegradation of Plastics by Microorganisms | Mazumder, M.A.R. Jubayer, M.F. Ranganathan, T.V. | 2021 | Biotechnology for Zero Waste: Emerging Waste Management Techniques | - | - |

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| 49 | Biogas production by pilot-scale anaerobic co-digestion and life cycle assessment using a real scale scenario: Independent parameters and co-substrates influence | Mosquera, J. Rangel, C. Thomas, J. Santis, A. Acevedo, P. Cabeza, I. | 2021 | Processes | 9 | 11 |
| 50 | A new concept of smart universities using internet of things (IoT) | Achenkunjujohn, A. Venkatesh Kumar, P. | 2020 | International Journal of Scientific and Technology Research | 9 | 3 |
| 51 | Modelling the thermal behaviour of GFRP reinforced concrete beams subjected to elevated temperature by standard fire exposure | Mathews, M.E. Manas, Y.S. Kiran, T. Anand, N. | 2020 | Journal of Physics: Conference Series | 1706 | 1 |
| 52 | An experimental study on concrete block using construction demolition waste and life cycle cost analysis | Abraham, J.J. Saravanakumar, R. Ebenanjar, P.E. Elango, K.S. Vivek, D. Anandaraj, S. | 2022 | Materials Today: Proceedings | 60 | - |
| 53 | Effect of elevated temperature on Stress-Strain behaviour of Self-Compacting concrete | Solomon, A.A. Mathews, M.E. Anand, N. Kiran, T. Jayakumar, G. Yadav, B.S.K. Sudheer, G. | 2021 | Materials Today: Proceedings | 49 | - |
| 54 | Valorization of Agro-industrial Discards in Fermentation for the Production of Cellulase Enzyme | Dinil, A. Jacob, A. | 2022 | Journal of Pure and Applied Microbiology | 16 | 1 |
| 55 | Smart solution for waste management: A coherent framework based on iot and big data analytics | Grace Mary Kanaga, E. Jacob, L.R. | 2021 | Advances in Intelligent Systems and Computing | 1167 | - |

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| 56 | Biosorption of Nickel from Metal Finishing Effluent Using Lichen Parmotrema tinctorum Biomass | Gratia, Z.K. Nandhakumar, R. Mahanty, B. Murugan, S. Muthusamy, P. Vinayak, K.S. | 2021 | Water, Air, and Soil Pollution | 232 | 11 |
| 57 | Development of banana peel powder as organic carrier based bioformulation and determination of its plant growth promoting efficacy in rice Cr100g | David Paul Raj, R.S. Agnes Preethy, H. Gilbert Ross Rex, K. | 2021 | Journal of Pure and Applied Microbiology | 15 | 3 |
| 58 | Characterization of refuse derived fuel samples prepared from municipal solid waste in Vellore, India | Thawani, B. Mahanty, B. Behera, S.K. | 2022 | Environmental Technology (United Kingdom) | 43 | 12 |
| 59 | Recovery of Precious Metals from Electronic and Other Secondary Solid Waste by Bioleaching Approach | Peter, D. Sakayaraj, L.S.A. Ranganathan, T.V. | 2021 | Biotechnology for Zero Waste: Emerging Waste Management Techniques | - | - |
| 60 | Low-Cost Real-Time Implementation of Malicious Packet Dropping Detection in Agricultural IoT Platform | Terence, J.S. Purushothaman, G. | 2021 | Lecture Notes in Networks and Systems | 127 | - |
| 61 | Multifunctional biogenic Al-doped zinc oxide nanostructures synthesized using bioreductant chaetomorpha linum extricate exhibit excellent photocatalytic and bactericidal ability in industrial effluent treatment | Somu, P. Khanal, H.D. Gomez, L.A. Vinaykumar, R. Shim, J.-J. Lee, Y.R. | 2022 | Biomass Conversion and Biorefinery | - | - |
| 62 | Heat pipe-embedded tooling for sustainable manufacturing | Kantharaj, I. Vijay, S.J. Vasanth, X.A. Mohanasundaram, S. Rai, R.S. | 2021 | Sustainable Manufacturing and Design | - | - |

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| 63 | Investigation on the performance of fiber reinforced concrete subjected to standard fire exposure | Varghese, A. Anand, N. Andrushia, D. Arulraj, P. | 2020 | World Journal of Engineering | 18 | 3 |
| 64 | Prospects of Metakaolin Admixed Palm Kernel Shell Solid Concrete Masonry Block: A Review | John, N. Shanthi, R.M. Tensing, D. | 2022 | Civil Engineering and Architecture | 10 | 4 |
| 65 | Correction to: Multifunctional biogenic Al-doped zinc oxide nanostructures synthesized using bioreductant chaetomorpha linum extricate exhibit excellent photocatalytic and bactericidal ability in industrial effluent treatment (Biomass Conversion and Biorefinery, (2022), 10.1007/s13399-022-03177-7) | Somu, P. Khanal, H.D. Gomez, L.A. Vinaykumar, R. Shim, J.-J. Lee, Y.R. | 2022 | Biomass Conversion and Biorefinery | - | - |
| 66 | Sorption isotherm study on vacuum and freeze-dried jamun pulp | Jebitta, R.S. Allwin, J.S.I. Pandian, K.N.S. | 2022 | Food Research | 6 | 1 |
| 67 | Recycling of saw dust as a filler reinforced cotton seed oil resin amalgamated polystyrene composite material for sustainable waste management applications | Newton Balakrishnan, M.E. Muralkar, P. Ranjana Ponraj, M. Nadiger, S. Dhandayutham, S. Justus, S. Bhagavathsingh, J. | 2022 | Materials Today: Proceedings | 58 | - |
| 68 | The State-of-the-Art Reverse Logistics for e-Waste Management: A Scenario Specific to India | Arun Vasantha Geethan, K. Jose, S. John, R. Ahmed, I.A. Rajan, P. Rajan, A.P. | 2022 | Strategies and Tools for Pollutant Mitigation: Research Trends in Developing Nations | - | - |

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| 69 | Covid medical waste segregation robot using Yolov5 | Masih, A.K. Stanley, P.K. | 2022 | AIP Conference Proceedings | 2670 | - |
| 70 | Characterization and molecular identification of poly urethane degrading bacteria | Yazhini, V.S. Prabha, M.L. Issac, R. | 2021 | Journal of Pure and Applied Microbiology | 15 | 3 |
| 71 | Synthesis of adsorbent from animal waste and its applications in industrial effluent treatment | Kandasamy, S. Baskaran, N. Jeyaprakash, R.K. Nagarajan, V. Manickam, N.K. Subbiah, K. | 2020 | AIP Conference Proceedings | 2240 | - |
| 72 | Approaches to Plant Nutrient Management Through Fertilization in India: Then, Now and the Future | Praveena Katharine, S. Suguna Devakumari, M. | 2022 | Reviews in Agricultural Science | 10 | - |
| 73 | Bioconversion of Waste to Wealth as Circular Bioeconomy Approach | Peter, D. Rathinam, J. Vasudevan, R.T. | 2021 | Biotechnology for Zero Waste: Emerging Waste Management Techniques | - | - |
| 74 | 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. Yattoo, 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 | 16 | 1 S |
| 75 | Classification Of Hyperspectral Images Using Deep Learning Architecture for Remote Sensing Applications | Mishaa Manikandan, M. Jennifer, C. Angel, M. Rachel, A. Diana Andrushia, A. Mary Neebha, T. | 2022 | 8th International Conference on Advanced Computing and Communicatio | - | - |

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| | | | | n Systems, ICACCS 2022 | | |
| 76 | Development of an advanced enzyme reusable saccharification process of waste paper pulp sludge material through membrane bioreactor system: A concept towards green solid waste management practices for PPS material | Dey, P. Vani, C. Abraham, A. Tripathy, M. Mathew, J. Greeshma, C.V. | 2020 | Research Journal of Chemistry and Environment | 24 | - |

Solid Waste Management

Collection of solid waste is done through placing collection bins strategically at different locations on campus. On segregation, the biodegradable waste is subject to degradation by organic composting and the bio-fertilizer thus obtained is utilized in the 329-acre experimental farm for academic, research and community development activities. The crop residues, dry leaves collected from hostels and gardens are recycled in vermicomposting pits at the Karunya farm. Nearly 4 tons of campus waste is recycled per year.



Vermicomposting Unit in North farm - KITS

Paper Waste Management

It is estimated that around 75 - 100 kg of waste paper is segregated from the collection bins on a daily basis on campus. KITS has installed a Paper Recycling Plant to the tune of Rs. 25 Lakhs

to make use of the waste paper generated on campus to produce eco-friendly paper. Currently, 25 – 30 tons of paper boards (Grey Board) are produced and sold to vendors on a yearly basis. This plant also serves as a model paper recycling facility for visiting students to develop entrepreneurial, research and leadership skills.



Paper Recycling Plant

The Karunya Hospital - an in-house medical facility serving 10,000 residents on campus generates 18 - 25 kg of biomedical waste per month and suitably disposed through agencies approved by the Tamil Nadu Pollution Control Board.



Collection of Biomedical Waste

Biogas Plant

KITS has installed 4 Biogas plants with an investment of Rs. 130 lakh to treat 360 cu.m of kitchen and food waste generated from its kitchens. These plants provide 114 kg of cooking gas/day (equivalent to 6 commercial gas cylinders) through the treatment of kitchen and food waste. Currently, around 70% of the night soil and 20 % of the food waste generated in the hostel zones (both ladies and gents) of Karunya Campus are treated by existing biogas plants.

A general outlay of the solid waste collected and treatment/management strategy used by KITS is tabulated below.

| Type of Solid Waste | Treatment / Management |
|---------------------|---|
| Solid Waste | All solid waste is subject to collection, segregation and disposal. Organic waste undergoes aerobic and vermicomposting |

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| Paper Waste | Managed through an ecofriendly paper recycling unit with a capacity to treat 75-100 kg of waste paper /day |
| E-Waste | Approximately 3,500 kg/year is generated and disposed through agencies authorized by Pollution Control Board |
| Biomedical Waste | Around 250-300 kg/year is generated and disposed through agencies authorized by Pollution Control Board |
| Kitchen and Food Waste | <ul style="list-style-type: none"> • 20% of the food waste is utilized through Biogas Plant. • 80% used for piggeries. |

Liquid Waste Management

The grey and black water from the residences are treated in the 5 Sewage Treatment Plants (STP) installed on campus, at an investment of Rs. 300 lakh. 2500 KLD of wastewater is treated at the STPs that are fitted with screens to remove large non-biodegradable solid, a fluidized bed bio-reactor for aerobic treatment of wastewater and a filtration system to remove suspended matter, micro-organisms and algae, and a sludge drying bed. The treated water is reused for gardening and irrigation through 118 outlets on campus.

STP - Father Duraisamy Residence – A case of effective liquid waste management

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| Feed given to STP | : Water from FDR, EGR & Hephzibah Hostels. |
| Capacity of the STP | : 4, 00,000 LPD |
| Number of beds available to remove the sludge | : 12 |
| Sludge removal from STP | : Once in 4 days |
| Number of beds filled | : 4 |
| Water Recycled at Father Duraisamy Residence | : 2, 40,000 LPD |

Sludge is utilised in farming and gardening purposes and the details are given below

1. JMR & JVR - Backside (Fields)
2. Syndicate Bank, New Auditorium - Garden
3. Hephzibah & Angelina Residence - Garden
4. Then fields extend up to SEMMEDU (outer).

Scientific and Technological Intervention in Waste Management at KITS

Faculty and students are actively involved in pilot projects related to waste management. At the Water Institute – a Centre of Excellence, the following research activities are pursued with grants from MoEF & CC and DST, GoI

- Evaluating the performance of the unit operations in the STPs, based on modeling and simulation studies – Model
- Periodic monitoring and characterization of the raw and treated effluents from STPs
- Biochar preparation using agricultural farm waste for purification of contaminated water

- Isolation of microbes from campus STPs for the bioremediation of waste water and treatment of effluents from small scale textile dyeing units in and around Coimbatore
- Treatment of used cutting fluid from mechanical workshops on campus using the Petroleum Remediation Product (PRP®), a NASA product from UniRem Technology, Pittsburgh, USA
- Treatment of greywater using microbial fuel cells.
- Recycling and reuse of detergent water using electrocoagulation technology
- A conceptual model on decentralized wastewater treatment at household and community level

A project titled “*Design of 2 TPD Rotary Kiln Gasification Pilot Plant with high CV syngas production*” was initiated at KITS with the objective of gasification of plastic waste. Run at a cost of Rs. 6.12 crores, this project will be a working model for industries/ governments. This project offers stakeholders the opportunity to better understand plastic waste disposal in an environmentally friendly manner while producing energy, which will partially offset the cost of waste management.



Plastic Gasification Unit at KITS