



**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 2- ZERO HUNGER**

*End hunger, achieve food security, improve nutrition and promote sustainable agriculture.*

FAO states that there has been a nearly 50% reduction in the number of people suffering from undernourishment over the past two decades as a result of rapid economic growth and increased agricultural productivity. The Union Minister for Agriculture and Farmers Welfare, Shri Narendra Singh Tomar has said that India, apart from being self-sufficient in food production, has the capacity to meet the food requirements of a large part of the world. Regrettably, extreme hunger and malnutrition continue to pose significant obstacles to development in various regions. The fifth National Family Health Survey (NFHS-5) data, conducted in 2019-21, indicated that among mothers with a child between ages 6-23 months, 18% reported that their child did not eat any food in the 24 hours preceding the survey, referred to as “zero food” (S V Subramanian, Smriti Sharma, Indian Express, May 3, 2023)

The Sustainable Development Goals (SDGs) aspire to eradicate all forms of hunger and malnutrition by 2030, ensuring that everyone, especially children, has access to sufficient and nutritious food throughout the year.

KITS is on a mission to find solutions to human problems in areas relating to Water, Food, Health care and Sustainable Energy through scientific, social and technological research. The university houses 8000 students and 690 faculty and staff on campus representing diverse, cultures, languages and food habits.

**Publications related to Zero Hunger: 46 (Annexure-I)**

### **Campus Food Waste:**

**Campus food waste tracking:** Nearly 8000 students reside in the Resident Halls on campus. 20 % of the 2.5 tonnes of food waste per day from both the boys and girls hostels are treated in three biogas plants of 80 m<sup>3</sup> capacity. The treated effluent from the biogas plant is diverted to STP in the Bethany Resident Hall for storage and utilized for irrigation/gardening. The gas generated is utilized for cooking. Also, the sludge obtained from STP is disposed on land as bio-fertilizer after composting.

### **Student Hunger**

**Student Food Insecurity and Hunger:** To address student food insecurity and hunger, awareness of food conservation is generated among the student community. Regular information on preventing food wastage is posted in the WhatsApp group of mess representatives and communicated to all the students.

**Students and staff hunger interventions:** There are 4 food outlets on the university campus that provide breakfast, lunch and snacks of continental, south Indian and north Indian food cuisine. There are also 4 additional outlets meant for Tea/ Coffee and fresh fruit juices from 09:00 am to 05:00 pm. Students have the choice to select their preferred cuisine from the available Tamil Nadu, South Indian, Andhra, Kerala and NRI mess. Healthy snacks such as green/bengal gram sprouts/boiled peanuts along

with Tea/ Milk are served in the evening. Outsourced food outlets for Bakery items, steamed foods, tender coconut and fresh fruit juices, and beverages also cater to the needs of students and staff. Besides, there are 7 food vending machines on campus for any time access.

### **Sustainable Food Choices on Campus:**

Since students are from different states and abroad, with diverse food cultures, KITS has five types of food mess viz., Tamil Nadu, Kerala, Andhra Pradesh, North India and NRI mess. Sustainable foods are also taking part in the dining of students and staff. As a part of the degree, B.Sc. (Hons.) Agriculture students undergo Experiential Learning Programme (ELP) during the final semester. In the module, mushroom cultivation technology, the harvested mushrooms are value-added and sold to students and staff. Similarly in the food processing technology module, sustainable foods like millet-based value-added products were sold on campus and through a sales counter located at Bethesda.



**Mushroom Production by ELP Students**



**Mushroom Production by ELP Students**

### **Provide healthy and affordable food choices for all on campus.**

Every two months, the food menu is revised according to the choice of the students with the recommendation of the mess committee. To ensure hygienic food prepared in the hostels is tested as per the standards. KITS has a sales center for farm produce and farm products at designated locations where all the KITS farm products, including organic fruits and vegetables and healthy food products prepared during ELP modules of B.Sc (Hons.) Agriculture Program is marketed to students and staff at an affordable price.

### **Proportion of graduates in agriculture and aquaculture including sustainability aspects:**

Total number of graduates in Agriculture 2022: 1698

Total number of agriculture graduates in the year 2022: 161

Proportion of graduates in agriculture: 9.48

## National Hunger

### Access to Food Security Knowledge

Good agricultural practices increase crop productivity thereby food security. Hence farmers' access to sustainable agricultural practices is essential to raise crop yield. To connect the final year B.Sc (Hons.) Agriculture students with farmers in their Rural Agricultural Work Experience Programme (RAWE), KITS has signed MoUs with 13 ICAR-Krishi Vigyan Kendra- (Farm Science Centers) for knowledge sharing with the farmers across Tamil Nadu, Kerala and Telangana. Students were involved in taking agriculture knowledge to the local farmers through various field demonstrations, exhibitions, outreach programmes and village attachments covering more than 700 farmers in districts of Tamil Nadu and Kerala. To improve farm efficiency, advanced agricultural technologies like drones for spraying fertilizers and pesticides are demonstrated by our students to the farmers during RAWE programme.



**Knowledge Sharing with Farmers through demonstrations**

### Events for Local Farmers and Food Producers

In order to connect to the farming community and transfer knowledge, KITS organizes events for local farmers and food producers through Plant clinics /exhibitions as part of the RAWE programme.



## Knowledge Sharing with Farmers through method demonstrations

### University Access to Local Farmers and Food Producers

The School of Agricultural Sciences has state-of-the-art laboratory facilities in the areas of Soil Science and Agricultural Chemistry, Plant Pathology, Plant Genetics and Breeding, Entomology and Horticulture which serve as the knowledge hub to disseminate appropriate information to farmers.



### Soil and Water Testing Lab in School of Agricultural Sciences

**KARUNYA INSTITUTE OF TECHNOLOGY AND SCIENCES**  
(Deemed To Be University)  
Coimbatore, India  
School of Agricultural Sciences  
Soil Science And Agricultural Chemistry Laboratory

#### SOIL HEALTH CARD

NAME OF THE FARMER : Mr. DINESH  
ADDRESS: Near Karunya Police station, Karunya Nagar, Coimbatore.  
SURVEY NUMBER:  
LATITUDE:  
LONGITUDE:  
FARM SIZE : 3 1/2 Acres.  
MOBILE NUMBER: +91 90039 61739  
SAMPLE COLLECTED ON: 28.01.2023  
REPORT ISSUED ON: 17.02.2023

NO FOOD WITHOUT SOIL,  
SOIL IS LIFE, CONSERVE IT.

SOIL SAMPLE DETAILS மண் மாதிரி விவரங்கள்					FERTILIZER RECOMMENDATION உரையறிவுரை			
IRRIGATED/ RAINFED பாசன விவரம்		Irrigated			MACRONUTRIENTS (Kg/ acre – g/tree) உரையறிவுரை (கிலோஏக்கர் – கிரம்/ மரம்)			
CROPS GROWN பயிரிடப்பட்ட பயிர்கள்		Chilly, Coconut, Ladies finger and Cabbage.			N நைட்ரஜன்	48	UREA யூரியா	104
SOIL TESTING RESULTS மண் ஆய்வு முடிவுகள்					P <sub>2</sub> O <sub>5</sub> பிஸ்பி	24	SINGLE SUPER PHOSPHATE சூப்பர் பிஸ்பி	150
S.NO	PARAMETERS	RESULT			K <sub>2</sub> O பிளாஸ்டர்	24	MURIATE OF POTASH மியூரியேட் ஆஃப் பொட்டாஷ்	40
7	SOIL COLOUR (மண்ணின் நிறம்)	Dark Yellowish Brown			MICRONUTRIENTS (Kg/ acre – g/tree) நுண்ணூட்டிச் சத்துக்கள் (கிலோஏக்கர் – கிரம்/ மரம்)			
8	SOIL TEXTURE (மண் நுண்மம்)	Clay Loam			FERROUS SULPHATE இரும்புசல்பேட்	-	COPPER SULPHATE தாமிர சல்பேட்	-
9	BULK DENSITY (கொந்த அடர்த்தி)	1.1764			MANGANESE SULPHATE மாங்கனீசு சல்பேட்	-	BORAX பொராக்சைடு	5
10	CALCIUM CARBONATE (கண்ணாம்பு நிறம்)	Slightly Calcareous			ZINC SULPHATE துத்தநாசு சல்பேட்	-	SODIUM MOLYBDATE சோடியம் மாலிப்டேட்	-
S. NO	PARAMETERS	TEST VALUE	UNIT	RATING	GREEN MANURES/ ORGANIC MANURES/ BIOFERTILIZERS			
1	pH	8.13		Saline	GREEN MANURES (பசுநீர் உரம்)	-	1/acre - Kg/tree (1.எ.ஏக்கர் – கிலோ/ மரம்)	
2	EC	0.18	dSm <sup>-1</sup>	Normal	FARMYARD MANURE (கொழு உரம்)	10	1/acre - Kg/tree (1.எ.ஏக்கர் – கிலோ/ மரம்)	
3	ORGANIC CARBON (அகல அளவு)	0.618	%	Medium	BIOFERTILIZERS AZOSPIRILLUM/ RHIZOBACTERIUM	-	packets/acre - g/tree (பாக்டீரியாக்கள் – கிரம்/ மரம்) 1 packet = 200g	
4	AVAILABLE NITROGEN (உபயோகத்திற்கு)	280	Kg/ha	Medium	BIOFERTILIZER – 200g/packet PHOSPHOBACTERIUM	-	packets/acre - g/tree (பாக்டீரியாக்கள் – கிரம்/ மரம்) 1 packet = 200g	
5	AVAILABLE PHOSPHOROUS (மணியச்சத்து)	23.744	Kg/ha	High				
6	AVAILABLE POTASSIUM (உபயோகத்திற்கு)	537.6	Kg/ha	High				
7	IRON (ppm) இரும்பு	-	COPPER (ppm) தாமிரம் (Cu)	-				
8	MANGANESE (ppm) மாங்கனீசு	-	Zinc (Zn) (ppm) துத்தநாசு	-				

### Soil Health Cards and advisories given to farmers

Soil and water samples are tested free of cost at the Soil Science and Agricultural Chemistry lab and issue Soil Health Cards are given to farmers as free advisory services.

The Pathology lab of the School of Agricultural Sciences helps the farmers in the identification of plant diseases and provides recommendations for the control of plant diseases. Biofertilizers and bioagents produced in the lab are sold to farmers at an affordable price.



**Biofertilizers and bio-agents production**

Students of B.Sc (Hons) Agriculture in their ELP programme module on Commercial Nursery Management cultivate vegetables, fruits and medicinal saplings which are sold to farmers at reasonable prices.



**Commercial Nursery by ELP students**

**Sustainable Food Purchases**

To enable local farming community to generate income KITS purchases fruits and vegetables for the hostel mess from the local wholesale traders at Irrutupallam, 3 km away from the university campus.

**Research**

KITS is involved in research leading to innovation, incubation and entrepreneurship. Faculty and students work towards development of products and file patents. Faculty members published 46 papers in Scopus/WoS indexed Journal Publications related to Zero Hunger during the year 2021 and 2022

S. No.	Title	Authors	Year	Journal	Vol	Issue
1	Recognition of bloom/yield in crop images using deep learning models for smart agriculture: A review	Darwin, B.  Dharmaraj, P.  Prince, S.  Popescu, D.E.  Hemanth, D.J.	2021	Agronomy	11	4
2	Hyperspectral and multispectral image fusion techniques for high resolution applications: A review	Sara, D.  Mandava, A.K.  Kumar, A.  Duela, S.  Jude, A.	2021	Earth Science Informatics	14	4

3	Machine Vision and Machine Learning for Intelligent Agrobots: A review	Bini, D.  Pamela, D.  Prince, S.	2020	ICDCS 2020 - 2020 5th International Conference on Devices, Circuits and Systems	-	-
4	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	-
5	Hormonal crosstalk in regulating salinity stress tolerance in graminaceous crops	Choudhary, P.  Pramitha, L.  Rana, S.  Verma, S.  Aggarwal, P.R.  Muthamilarasan, M.	2021	Physiologia Plantarum	173	4
6	Azadirachtin-based biopesticide affects the respiration and digestion in <i>Anticarsia gemmatalis</i> caterpillars	Farder-Gomes, C.F.  Saravanan, M.  Martínez, L.C.  Plata-Rueda, A.  Zanuncio, J.C.  Serrão, J.E.	2022	Toxin Reviews	41	2
7	SARS-CoV-2 emerging Omicron subvariants with a special focus on BF.7 and XBB.1.5 recently posing fears of rising cases amid ongoing COVID-19 pandemic	Dhama, K.  Chandran, D.  Chopra, H.  Aminul Islam, M.  Emran, T.B.  Rehman, M.E.U.  Dey, A.  Mohapatra, R.K.  Praveen, S.V.  Mohankumar, P.  Sharma, A.K.  Bhattacharya, P.	2022	Journal of Experimental Biology and Agricultural Sciences	10	6
8	Optimally tuned interleaved luo converter for pv array fed bldc motor driven centrifugal pumps using whale optimization algorithm—a resilient solution for powering agricultural loads	Jegha, A.D.G.  Subathra, M.S.P.  Kumar, N.M.  Ghosh, A.	2020	Electronics (Switzerland)	9	9
9	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
10	Production of silicon nanoparticles from selected agricultural wastes	Adebisi, J.A.  Agunsoye, J.O.  Ahmed, I.I.  Bello, S.A.  Haris, M.  Ramakokovhu, M.M.  Hassan, S.B.	2021	Materials Today: Proceedings	38	-
11	Leaf Pathology Detection in Potato and Pepper Bell Plant	Aldhyani, T.H.H.  Alkahtani, H.	2022	7th International Conference on Communication	-	-

	using Convolutional Neural Networks	Eunice, R.J.  Hemanth, D.J.		and Electronics Systems, ICCES 2022 - Proceedings		
12	Genetic diversity, allelic variation and marker trait associations in gamma irradiated mutants of rice ( <i>Oryza sativa</i> L.)	Ramchander, S.  Leon, M.T.A.P.  Souframanien, J.  Arumugam Pillai, M.	2022	International Journal of Radiation Biology	98	1
13	Futuristic IoT based Smart Precision Agriculture: Brief Analysis	Swamidason, I.T.J.  Pandiyarajan, S.  Velswamy, K.  Leela Jancy, P.	2022	Journal of Mobile Multimedia	18	3
14	Genomic designing for abiotic stress tolerance in Foxtail Millet ( <i>Setaria Italica</i> L.)	Rana, S.  Pramitha, L.  Muthamilarasan, M.	2021	Genomic Designing for Abiotic Stress Resistant Cereal Crops	-	-
15	A Novel Approach for Effective Crop Production using Machine Learning	Chowdary, V.T.  Robinson Joel, M.  Ebenezer, V.  Edwin, B.  Thanka, R.  Jeyaraj, A.	2022	Proceedings of the International Conference on Electronics and Renewable Systems, ICEARS 2022	-	-
16	Scope and recent trends of artificial intelligence in Indian agriculture	Mary, X.A.  Popov, V.  Raimond, K.  Johnson, I.  Vijay, S.J.	2022	The Digital Agricultural Revolution: Innovations and Challenges in Agriculture through Technology Disruptions	-	-
17	Clustering and principal component analysis of traditional rice landraces grown under in vitro moisture stress condition	Anupriya, R.  Geetha, S.  Rajakumar, D.  Senthil, S.A.  Thankappan, S.  Binodh, A.K.	2020	Plant Cell Biotechnology and Molecular Biology	21	42
18	Rhizosphere competent pseudomonas indoloxydans (F3-47) as a plant growth promoter and enhancer of zeamays l. under greenhouse and field trials	Reena Josephine, C.M.  Thomas, J.	2021	Current Trends in Biotechnology and Pharmacy	15	5
19	Drought prediction using artificial neural network	Metta, P.S.  Chintamaneni, A.  Kumar, A.  Yadav, J.  Kumar, V.  Bhaskar, B.	2022	2022 2nd International Conference on Advance Computing and Innovative Technologies in Engineering, ICACITE 2022	-	-

20	Multi-omics intervention in <i>Setaria</i> 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	13	-
21	Nutritional, textural, and sensory quality of oil fried donut enriched with extracted dietary fiber and okara flour	Huq, S.  Das, P.C.  Islam, M.A.  Jubayer, M.F.  Ranganathan, T.V.  Mazumder, M.A.R.	2021	Journal of Food Processing and Preservation	45	3
22	Biofertilizers: A Sustainable Approach Towards Enhancing the Agricultural Productivity	Mohanty, S.S.	2021	Biomolecular Engineering Solutions for Renewable Specialty Chemicals: Microorganisms, Products, and Processes	-	-
23	Dryland Livestock Rearing Relies Heavily on Tree fodders: A Narrative Review	Manuvanthra, A.  Chandran, D.  Emran, T.B.  Aslam, M.M.K.  Savanth, V.V.  Kumar, M.  Sharma, R.  da Silva, L.E.  Pran, M.  Lishma, N.P.  Sureshkumar, R.	2022	Indian Veterinary Journal	99	10
24	Biogenic larvicidal formulation of metabolites from <i>Steinernema saimkayi</i> symbiont <i>Xenorhabdus stockiae</i> KUT6 against dengue vector <i>Aedes aegypti</i>	Jissin, M.  Vani, C.	2020	Tropical Biomedicine	37	3
25	Comparative Study on Recognition of Food Item from Images for Analyzing the Nutritional Contents	Sreetha, E.S.  Naveen Sundar, G.  Narmadha, D.	2022	Lecture Notes in Electrical Engineering	905	-
26	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
27	Enabling technologies for future robotic agriculture systems: A case study in Indian scenario	Mary, X.A.  Mani, K.  Raimond, K.  Johnson, I.  Dinesh Kumar, P.	2022	The Digital Agricultural Revolution: Innovations and Challenges in Agriculture through Technology Disruptions	-	-



28	Performance of black rice ( <i>Oryza sativa</i> ) varieties grown in Namsai district of Arunachal Pradesh, India	Sangma, R.R.  Manpoong, C.  Sharma, A.  Devadas, V.S.  Singh, D.  Pandey, H.	2022	Research on Crops	23	1
29	Robotic Utilization in Farming Field—A Review	Arulkirubakaran, D.  Malkiya Rasalin Prince, R.  Neil Anand, K.  Manikandan, N.  Jenny Manaswitha, D.  Lavanya, A.  Suresh, M.N.  Kishore, K.C.S.  Chauhan, B.  Vishal, S.	2022	Lecture Notes in Mechanical Engineering	-	-
30	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	-	-
31	A preliminary study on design of a modular agricultural mobile robot	Joseph, D.M.  Santhosh, S.  Yesudas, K.  Sojan, A.  Mahanta, G.B.	2022	AIP Conference Proceedings	2670	-
32	UAVs for multidisciplinary applications: Introduction	Govarthan, R.  Hariharan, S.  Paul, J.  Mary, T.B.  Sagayam, K.M.  Elngar, A.A.	2022	Unmanned Aerial Vehicles and Multidisciplinary Applications Using AI Techniques	-	-
33	An analysis of total factor productivity of cotton in Tamil Nadu	Kavitha, V.  Usha Nandhini, S.  David Chella Baskar, V.	2021	Ecology, Environment and Conservation	27	1
34	Self-supervised representation learning framework for remote crop monitoring using sparse autoencoder	Anitha, J.  Akila Agnes, S.  Immanuel Alex Pandian, S.	2021	Advances in Intelligent Systems and Computing	1167	-
35	A preliminary study on autonomous drone systems for agriculture pesticide spraying	Vishal, R.  Mahanta, G.B.	2022	AIP Conference Proceedings	2670	-
36	Genomic designing for biotic stress tolerance in Foxtail Millet ( <i>Setaria italica</i> L.)	Rana, S.  Pramitha, L.  Aggarwal, P.R.  Muthamilarasan, M.	2021	Genomic Designing for Biotic Stress Resistant Cereal Crops	-	-
37	Impact of Plant Health on Global Food Security: A Holistic View	Srinivasan, T.S.  Thankappan, S.	2022	Agriculture, Environment and Sustainable	-	-

		Balasubramaniam, M.  Bhaskar, V.		Development: Experiences and Case Studies		
38	Impact of IoT based Autonomous Farming Equipment on Crop Culture and Management in the Agricultural Sector	Kumar, N.  Singh, A.  Das, D.  Srivastava, D.  Talari, V.S.R.  Kurukwar, A.D.	2022	International Conference on Edge Computing and Applications, ICECAA 2022 - Proceedings	-	-
39	Drip Fertigation with Fertilizer Prescription Through STCR—IPNS—A Way Forward Towards Climate Change Mitigation	Rangasamy, S.  Subramaniam, M.  Stephen, P.K.  Dey, P.	2022	Lecture Notes in Civil Engineering	176	-
40	Arduino based low-cost greenhouse monitoring system for small scale farmers	Anisha, M.  Arsad, U.M.  Starly, P.J.  Dhanalakshmi, K.  Anitha, S.  Benisha, M.  Chezhiyan, P.  Elliot, C.J.	2021	Proceedings of the 3rd International Conference on Intelligent Communication Technologies and Virtual Mobile Networks, ICICV 2021	-	-
41	In vitro bio-efficacy of biocontrol agents and oil cakes against <i>Pythium aphanidermatum</i> from tomato	Madhumitha, B.  Gnanaprakash, S.  Jayapradha, C.  Thankappan, S.  Rathikannu, S.  Priyanga, T.	2022	Journal of Environmental Biology	43	6
42	An Investigation on Impact of Malnutrition in Human Health and Technique to Evaluate the Nutrient Intake from the Food Image	Sreetha, E.S.  Sundar, G.N.  Narmadha, D.	2022	2022 IEEE International Power and Renewable Energy Conference, IPRECON 2022	-	-
43	Wearable Environmental Monitoring System for Measurement of Environmental Parameters: A Pilot study	Jegan, R.  Evangeline, A.B.  Nimi, W.S.	2022	Proceedings - International Conference on Augmented Intelligence and Sustainable Systems, ICAISS 2022	-	-
44	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	-
45	An Analysis on Farmers Awareness and Perception Towards Pradhan Mantri Fasal Bima Yojana Scheme	Kavitha, V.  Nandhini, S.U.	2022	International Journal of Agricultural and	18	2

	In Coimbatore District of Tamil Nadu			Statistical Sciences		
46	A study on organic produce marketing in Coimbatore district of Tamil Nadu	Kavitha, V.  Chandran, K.  Usha Nandhini, S.	2020	Plant Archives	20	-

KITS is committed to participate in working towards achievement SDG 2 through education and research leading to finding solutions for human problems.