



SDG 2: ZERO HUNGER

END HUNGER, ACHIEVE FOOD SECURITY AND IMPROVED NUTRITION AND PROMOTE SUSTAINABLE AGRICULTURE

The Indian Institute of Technology, Gandhinagar (IITGN) takes several measures to ensure adequate food security and improved nutrition among the community members, especially the students. The institute plans to expand its organic farming area, in an effort to balance the demand and supply of organic produce at the campus. IITGN Innovation and Entrepreneurship Centre (IIEC), a technology business incubator located at the institute, with a mission to foster techno-entrepreneurship supports agriculture and food-related startups, assisting innovative ideas to become reality. Several research projects are also undergoing at the institute in the areas of food and nutrition.

Research

Several mixed methods research projects are being undertaken at the institute including social determinants of undernutrition in India, evaluation of a nutrition-education intervention in the slums of Ahmedabad, and take-home ration services of integrated child services scheme. The institute is one of the eight nodal institutions identified by the Food Safety and Standards Authority of India (FSSAI) for NetSCoFAN (Network for Scientific

Co-operation for Food Safety and Applied Nutrition), a network of research & academic institutions working in the area of food & nutrition, launched by Union Health Minister in January 2020. These groups of institutions working in different areas viz. biological, chemical, nutrition & labelling, food of animal origin, food of plant origin, water & beverages, food testing, and safer & sustainable packaging, would develop a 'Ready Reckoner' that will have the inventory of all research work, experts and institutions and would carry out and facilitate research, survey, and related activities. An Impacting Research Innovation and Technology (IMPRINT) project, supported by the Ministry of Human Resource Development titled "Reusable and field-deployable nano bio-catalysts for detection of pesticides and herbicides" is also underway at the institute. The team has developed a field-deployable reusable prototype approach that is capable of colorimetric detection of the most widely used herbicides at sub-ppm levels.

One of the research groups in the Humanities and Social Sciences discipline at the institute investigated the role of the intersection of maternal empowerment, paternal gender-equitable attitudes, and household wealth in stunting and severe stunting among under-fives in India. The research highlights that women's autonomy as well as focusing on men's attitudes towards gender equity has considerable potential in improving child health, particularly reducing the risk of child undernutrition. The research findings suggest programmatic interventions to address the linkage between parental gender-related perspectives and child undernutrition. (Source: <https://bmjopen.bmj.com/content/11/8/e047276>)

Another study involving nutrition promotion among Indian children and youth revealed that while the mother was majorly involved in carrying out child-feeding and child-care responsibilities, the hierarchical familial structure offered constrained capacity for navigating barriers imposed by the socio-cultural context in exercising her choices. The study identified certain intervention design features, including the central role of the family in facilitating the mother's participation as well as initiation and sustenance of recommended behaviour change.

A report has been prepared on the 'Take Home Ration service' of the integrated child services scheme by a research group. The report elucidates a comprehensive picture of the type of Take Home Ration (THR) distributed in several districts of India by documenting the current status of THR in select states of India. The authors mention that the report should be treated as a first attempt to document the contents of Take Home Ration, the fortification process of THR, supply, delivery, and distribution mechanism of THR at the district level. (Source: <http://malavikasubramanyam.com/projects>)

About 10 researchers at the institute have their research focus on food security and hunger. Nine articles were published in reputed journals covering topics related to drought and famine, integrated child development services, etc. in the years 2019 and 2020.

Operations

The institute encourages sustainable food practices and supports young entrepreneurs working in the area of agriculture. The mess contractors responsible for serving food in the two dining halls are directed to have appropriate Food Safety License, Registration/ Ghumastadhara, Commercial Tax License, and other license/permits mandated/required by the government and local authorities. The institute strives to responsibly manage the food supply chain and engages in programmes and initiatives that could contribute to lower environmental impacts. Some of the measures taken by the institute are mentioned below.

Sustainable food policy

The institute encourages efforts to ensure healthy eating practices for the campus community and high-quality services at all eating establishments on campus. IITGN ensures high standards for the quality of food served in its dining halls and other eating establishments. Appropriate measures are taken to maintain cleanliness and hygiene. All the food establishments on campus are required to have valid FSSAI licenses.

Thus, the institute provides sustainable, healthy, and affordable food choices for all on campus. The institute focuses on healthy food habits; the menu served in the mess is tailored every month by the student mess council for a balanced diet that provides the body with essential nutrition. Besides, all the food establishments use fortified foods (+F) such as double fortified salt, rice, wheat flour, oil, and milk, to further enhance food nutrition. Specifications and guidelines to ensure a sustainable and balanced diet have been mentioned in the mess contracts.

IITGN promotes local and seasonal foods by the inclusion of such vegetables and fruit items in the monthly menu.

The food waste is sent to the in-house biogas plant and

compost pits to make manure.

The mess contractors are required to use only those items/ raw materials that conform to quality standards, prescribed under the prevention of Food Adulteration Act, etc and as far as possible shall have the standards/branded bearing the mark "AGMARK" or "ISI", or "FSSAI". All materials purchased for the preparation of food, such as raw materials, have to conform to the known standards/ brands and specifications as laid down by IIT Gandhinagar and suggested by the Commercial Establishment Management Committee (CEMC) from time to time.

Stock adequacy in the mess

The Contractor shall, at their own cost, maintain adequate stocks (minimum one week running stock of non-perishable items) of food-grain, grocery, and other eatables for the satisfactory and efficient running of the mess. The quality of the foodstuffs and eatables is specified by the institute, and subject to inspection by CEMC.

The institute expects professionalism in all aspects of the mess operations from the Contractor. This includes quality of raw materials and foods, professionalism in service, and conduct of staff. The hygiene should be of the topmost quality.

Tracking of food waste

The mess committee regularly conducts awareness programmes to reduce food wastage. A notice board outside both the dining halls displays the amount of daily food wastage to create a sense of responsibility among the community.

In order to curb food wastage, competitions are held regularly among the messes. The students dining in the mess with minimum food wastage are rewarded with additional sweets/ desserts. Food waste (wasted food, peels of fruits and vegetables etc.) of mess is sent to the biogas plant. Excess if any is used in compost pits for the preparation of compost.

Food waste challenge: Organic waste is measured for the entire institute. The first-year BTech students at IITGN took up a challenge to reduce food wastage by their batch to less than 10 Kgs in a single day to create awareness among students to not take more food than what they can eat. The students achieved the target successfully as the total food wasted by the entire BTech 2019 batch was 2 Kg 160g.

Food kiosks and outlets

Food kiosks and outlets are available for providing food options to students and staff throughout the day and night. This is one of the interventions to target hunger among students and staff, during the times when dining halls are not serving meals.





The IITGN organic farm grows several varieties of vegetables like cabbage, cauliflower, tomato, brinjal, potato, cucumber, bottle-gourd, ladyfinger, spinach, fenugreek, carrot, beetroot, cluster beans, long beans, chillies, green garlic, green tuwar and coriander, etc. It also cultivates special vegetables like broccoli, kale, zucchini, lettuce, pumpkin, and so forth. Farm activities are being expanded by growing millets and wheat. It uses only completely organic fertilisers for growing various crops. Community members can participate in the volunteer programme and contribute to the organic farm activities. The ground floor apartments of staff and faculty have been provided with kitchen gardens. Moreover, during the pandemic, when there was difficulty going to markets, the organic farm group delineated spaces in housing areas for kitchen gardens and encouraged the residents to actively participate and grow vegetables and fruits of their own choice. Many students are also encouraged to grow their own vegetables (spinach, tomatoes, fenugreek leaves, etc.) in the designated area either provided at the hostel or in collaboration with organic farm. Adequate guidance and materials are provided by the organic farm representatives.

Essential items supply through volunteer group during Covid-19

A volunteer group named Special Volunteer Force was formed by the institute, comprising students, staff, and faculty who had voluntarily come together to help fellow community members in challenging times. The group undertook several responsibilities including coordinating with external vendors of essential items to supply fruits, vegetables, groceries to the institute, ensuring that relevant norms are being followed, regularly inquiring about the patients' well-being in the guest house and housing blocks, delivering food to the Covid-positive patients in the housing blocks, or travelling outside the campus to meet needs of urgent medical situations.

Sustainable agriculture and food-related startups

There are a few startups supported by IIEC, that focus on

digital and technical transformation in the agriculture sector, reduction of food waste, analysing and reducing the risk associated in agriculture and water sectors.

Agrocast Analytics, an agrarian forecasting and analytics firm, offers consulting services in the agriculture and water sectors. Analytical reports are generated using techniques such as machine learning, AI, agroclimatic analytics to generate reports which support farmers, crop insurance companies, solar park companies, and others in decision making. The organisation monitors crop health, soil moisture conditions and assesses climate change associated risks to provide the best possible solutions to its stakeholders.

InfyU Labs, an agritech company with IoT-based products for quality assurance of fruits and vegetables. It has developed a non-invasive handheld device, based on the principles of spectroscopy and AI algorithms to quantify the chemical composition of fruits and vegetables. The organisation provides accurate results using powerful deep learning algorithms, to benefit stakeholders such as quality managers, food processing retailers, marketers, wholesalers, e-commerce agents, etc. in the food safety and supply chain, resulting in a significant reduction in food wastage. It was the national winner of Youth Co:Lab, a programme launched in India in 2019 by United Nations Development Programme (UNDP) and Atal Innovation Mission, with a focus on specific SDGs.

AgroGenie, an agritech startup (Farming-as-a-Service/ FAAS based) that provides online and on-farm management services to help farmers produce more from the same piece of land. Keeping in view the challenges of lack of knowledge for quality production and high productivity, lower acceptance of organic farming due to yield loss, and other such aspects of agricultural farming, the startup offers several solutions including one to one personal field support to the farmers, crop-wise day-wise schedules and follow-ups on the app, production-oriented live scheduling of the crop based on soil, water, crop age, crop condition and weather of the field, etc. Thus, the startup aims to minimise the cost of cultivation, manage the production with the proper application of inputs on time and uplift the living standards of the farmers.

Krsikx, an agritech startup focuses on enhancing the accessibility of cold storage systems for farmers. Generally, a large proportion of cold storage systems are stagnant or immovable and farmers are forced to travel several kilometres to store their perishable produce, thus also increasing the cost price of the items. Fruits and vegetables also tend to get wasted in the process due to mismanagement in handling, sorting, etc. The startup has introduced a tent-based portable preservative, which may be used by smallholder farmers, logistics managers, etc. to extend the shelf life of fruits and vegetables. The benefits

include non-cooling technology, maintenance-free, powered by solar panel, simple and robust system, portability, and remote monitoring of the system. Thus, this startup strives to enhance the food value chain towards sustainability, lower wastage, and develop an ecosystem of eco-friendly processes. The startup was selected by the Ministry of Youth Affairs and Sports for a felicitation programme organised for the youth of India who had done phenomenal work in the period from 2017 to 2021. Kriskx was one among 32 awardees from all over India. It was also selected among the top 10 entries by the United Nations Development Programme for the best concept of building a better system to enhance the food processing industry, consisting of the cycle of fruits being plucked from the plants till it reaches the end consumer.

Education

CE 631: Irrigation Engineering and Hydraulic Structures is a course offered by the Civil Engineering discipline to graduate students for understanding water requirement of crops, different types of irrigation, groundwater flow equations, river training works, structures for silt control, etc.

CE 605: Remote Sensing of Land and Water Resources is another course that provides an overview of remote sensing, image classification, remote sensing data collection, geometric correction, image enhancement, interpretation and classification, thermal infrared remote sensing, change detection, monitoring of land and water resources, remote sensing of soil, vegetation, water, and urban areas, object-oriented classification, and spectral indices, all of which are helpful in studies and research related to the agriculture sector.

Invited lecture on 'The Food-water Quality Nexus in Periurban Aquacultures Downstream of Bangkok, Thailand' by Prof David Werner, Newcastle University on 17 September, 2019

Invited lecture on 'Universal Basic Income and Land Rights for Women: An Anti-Capitalist Critique' by Prof Nivedita Menon, Jawaharlal Nehru University, New Delhi on 4 November, 2019

Community outreach

Lunch at Organic Farm

More than 170 members of the IITGN community visited the organic farm on the campus on 19 January, 2020. The tour was followed by a village-style lunch and various recreational activities.

Bada Khana

Keeping up its practice of inclusiveness, IITGN organised a Bada Khana on 26 January, 2020 (Republic Day). All members of the IITGN community including faculty, staff, students, construction workers, engineers, architects, consultants, and their family members enjoyed eating together like one big family.

Supply of food during Covid-19

Committees such as Shramik Kalyan Samiti and Padosi Gram Sahyog Samiti provided various critical support to the construction labourers and nearby villages including supplying food items and cooked food.

The Padosi Gram Sahyog Samiti (committee formed for the welfare of the neighbouring villages Palaj and Basan during the national lockdown due to Covid-19 pandemic) members carefully identified 152 financially weak families from Palaj and Basan villages and conducted a drive to distribute kits containing daily essentials like oil, rice, flour, pulses, salt, red chilli powder, turmeric powder, sugar, and soap along with a handout of safety precautions to be followed.



IITGN Eat Right campus

Continuing its commitment to ensuring food safety and promoting healthy eating, IITGN has bagged the Eat Right Campus Award with a five-star rating from the Food Safety and Standards Authority of India (FSSAI) for two successive years.

The audit is done based on a checklist of the following five parameters: a) Compliance to food safety and hygiene; b) Healthy diets; c) Food waste management; d) Promotion of local and seasonal foods on campus, and e) Promotion and awareness on food safety and healthy diets in and around campus.

IITGN ensures strict compliance with all food standards and safety guidelines in each of its mess, food joints, and canteens on the campus. Both student mess and all the food joints on campus are licensed by FSSAI, and their food handlers are trained periodically by the Food Safety Awareness and Training Organisation (FSATO), an empanelled training partner of FSSAI. As the Covid-19 pandemic hit the country, IITGN took all precautionary steps to ensure adherence to safety measures and social distance by everyone in the mess and the food joints.

