



Zero Hunger

End hunger, achieve food security and improved nutrition and promote sustainable agriculture



Ringan Tulang, Berat Perut

SDG 2, which aims to end hunger, achieve food security, improve nutrition, and promote sustainable agriculture, is reflected in the classical Malay peribahasa “*Ringan tulang, berat perut*” (those who work hard will never go hungry). This proverb underscores the relationship between effort and sustenance, encouraging a culture of shared responsibility and mutual support for those in need.

At UM, this value is embodied through initiatives such as campus food banks, subsidized meal programs, sustainable urban farming, and food waste reduction efforts. These actions demonstrate UM’s commitment to ensuring that every member of its community has access to nutritious food. By addressing hunger directly and compassionately, the university contributes not only to student well-being but also to the broader global mission of eradicating hunger in all its forms.

Towards a Hunger-Free Campus: UM's 2024 Drive for Student and Staff Food Well-being

In 2024, Universiti Malaya (UM) continued to demonstrate its strong commitment to tackling food insecurity and promoting well-being among its campus community in alignment with Sustainable Development Goal 2: Zero Hunger. Throughout the year, the university implemented a series of comprehensive initiatives at multiple levels central, faculty, residential college, and hospital to ensure equitable access to nutritious food and to support those facing financial hardship. Led by the Student Welfare Matters Department (HEP) and strengthened through collaboration with faculties, student bodies, and external partners, these initiatives reflected UM's holistic and inclusive approach to welfare.

From the UM Food Bank and financial aid schemes to widespread meal distribution programmes such as Iftar Ramadan, Happy Lunch for Needy, and faculty-based food assistance projects, each effort aimed to reduce hunger while fostering a culture of empathy, solidarity, and community care. By sustaining these impactful interventions in 2024, Universiti Malaya reaffirmed its dedication to creating a compassionate and resilient campus environment where every student and staff member can thrive academically, socially, and emotionally without being hindered by food insecurity.

Student Welfare Matters (HEP) in Action: Ensuring No Student Faces Hunger

Universiti Malaya (UM) acknowledges that food insecurity can significantly impact students' well-being, concentration, and academic performance. To address this concern, the Student Welfare Matters (HEP) Unit plays a central role in providing support systems designed to alleviate hunger and ensure that students' fundamental needs are met. The unit is responsible for planning, managing, and implementing welfare assistance programmes that contribute to the holistic development of students, thereby enabling them to thrive in their studies.

A key initiative under this unit is the UM Food Bank (Food Bank Siswa UM), which serves as a vital resource for students experiencing financial hardship and food insecurity. Through this programme, essential food supplies are distributed to students in need, reducing the burden of hunger and promoting equitable access to basic nutrition. This initiative underscores UM's ongoing commitment to student welfare and to cultivating an environment in which academic success is not hindered by economic challenges.



In 2024, the Department of Student Affairs (*Jabatan Hal Ehwal Pelajar, JHEP*) received a substantial food product contribution worth RM344,446.20 from the Persatuan Empayar Kebajikan Malaysia (Empire Project) in collaboration with the Majlis Agama Islam Wilayah Persekutuan (MAIWP). The donation was transferred to the Student Welfare Division, JHEP for distribution to students in need through the Food Bank Siswa UM initiative. This contribution aims to help ease the financial burden faced by underprivileged students in meeting their daily food needs, while also providing moral support and encouragement.

JHEP extends its appreciation to the Empire Project and MAIWP for their generosity and continued concern for student welfare, which reflects their shared commitment and determination to ensure that Universiti Malaya students' well-being remains in optimal condition.



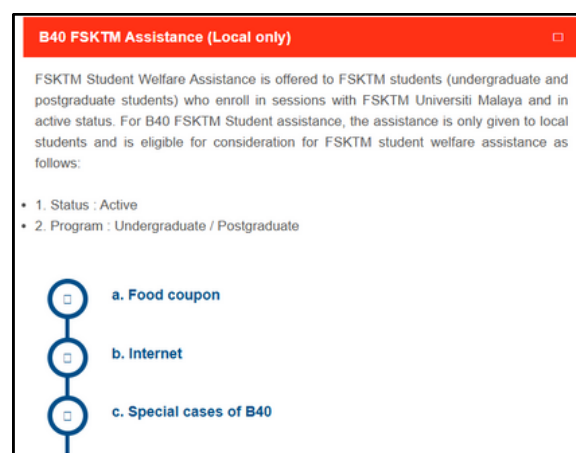
Above: Food Bank Siswa UM

Faculty-Led Initiatives to Address Student Food Insecurity

In addition to the central university initiative, several faculties and responsibility centres have also taken proactive steps to address student food insecurity and ensure that no student is left behind. These efforts demonstrate a collective commitment across Universiti Malaya to uphold student welfare and promote equitable access to basic needs support.

One notable example is the Food Coupon Programme for FSKTM Students, implemented by the Faculty of Computer Science and Information Technology (FSKTM). This initiative forms part of the FSKTM Student Welfare Assistance, which is designed to support both undergraduate and postgraduate students who are actively enrolled in any academic session at the faculty. The programme provides eligible students with food coupons that can be redeemed for meals, helping to ease their daily financial burden and ensure they have access to adequate nutrition.

In particular, the faculty extends special consideration to students from the B40 income group, prioritising local students who meet the established eligibility criteria for FSKTM welfare support. Through this targeted approach, the faculty ensures that assistance reaches those most in need, thereby contributing to Universiti Malaya's broader goal of fostering a supportive and inclusive learning environment.



Above: FSKTM Student Welfare webpage, which includes information on financial assistance and the Food Coupon Programme

APIUM Happy Lunch for Needy: A Continuous Annual Initiative to Support Underprivileged Students

Another noteworthy initiative is the Happy Lunch for Needy 9.0, a continuous programme organised annually by the Academy of Islamic Studies (APIUM), Universiti Malaya. This meaningful initiative aims to provide free nutritious meals to underprivileged students, ensuring that financial hardship does not affect their access to food and overall well-being.

The 2024 edition, known as Happy Lunch for Needy 9.0, marks the ninth consecutive cycle of this ongoing effort. Each cycle continues to uphold the same noble objective to ease the financial burden faced by students in need, promote a caring campus culture, and encourage a spirit of solidarity among staff, students, and the wider university community.



Above: Poster of application for Happy Lunch for Needy 9.0

Faculty and Department-Based Student Financial Aid Initiatives at Universiti Malaya

Apart from these central initiatives, several faculties and departments in Universiti Malaya have developed their own financial aid schemes to support students facing economic hardship. These schemes ensure that no student is left behind due to financial constraints, especially those struggling to afford daily necessities such as food. This faculty-level assistance complements the university's broader welfare efforts by providing targeted and timely support within each academic community.

For instance, the Faculty of Science offers financial aid through its Student Financial Aid Programme, which provides financial support to students experiencing monetary difficulties. Similarly, the Academic Services Department (ASD) manages a dedicated Financial Aid for Undergraduate Students scheme to assist students in overcoming financial challenges during their studies.

These initiatives reflect Universiti Malaya's holistic approach to student welfare one that extends beyond centralised programmes to include faculty-driven support systems, ensuring that all students, regardless of background, have equitable access to educational opportunities and essential living needs.

Furthermore, faculties across Universiti Malaya offer various forms of student aid, ranging from financial assistance to food-related support. Students are encouraged to explore the comprehensive list of available aids and programmes under SDG 1 (No Poverty) page 15, where detailed information and links to each faculty's assistance schemes are provided. These initiatives including food aid demonstrate UM's ongoing commitment to reducing student poverty and ensuring equitable access to education and well-being for all.

No One Left Hungry: Universiti Malaya's Mission Toward Zero Hunger

Under SDG 2 (Zero Hunger), Universiti Malaya (UM) remains committed to ensuring the well-being of its campus community by addressing food insecurity among students and staff. Through a series of targeted interventions, the university provides continuous support to reduce hunger and promote equitable access to nutritious food. These efforts include the establishment of food assistance programmes, meal distribution initiatives, and collaborations with external partners to enhance food accessibility on campus.

In 2024, Universiti Malaya strengthened its commitment to addressing food insecurity through university-wide interventions supporting students and staff in need. Led by the Student Welfare Matters Department (HEP) and supported by student bodies, these initiatives ensure consistent and accessible food assistance throughout the year.

Campus Iftar and Meal Support Initiatives

During 2024, numerous iftar and meal distribution programmes were organised across campus to foster solidarity and provide support for both students and staff. Among them, the Student Off-Campus Committee (JPLK), in collaboration with Wang Zheng Corporation Sdn. Bhd., organised a Special Iftar Ramadan Programme at Masjid TNB, Jalan Bangsar on 23 March 2024, which brought together 120 Universiti Malaya students, particularly those residing off campus. The initiative not only provided meals for breaking fast but also strengthened social and spiritual bonds among participants.

In addition, the Department of Human Resources, together with the Persatuan Kakitangan Akademik UM (PKAUM), Persatuan Pegawai Tadbir dan Ikhtisas (PEKERTI), and Kesatuan Kakitangan Am Universiti Malaya (KKAUM), hosted a Ramadan Iftar Programme on 27 March 2024. This event aimed to reinforce fraternity and cooperation between UM management and the wider university community, reflecting UM's holistic approach to staff well-being.

The Kesatuan Mahasiswa Universiti Malaya (KMUM) also implemented several inclusive initiatives such as “*Jelajah Iftar Ramadan*”, distributing free iftar meals across residential colleges, and the “Free Iftar Distribution at UM Central” on 26 March 2024. Prior to the mid-semester break, KMUM also organised a Free Bread and Water Distribution Drive, ensuring students returning home for Hari Raya had adequate refreshments for their journeys. These central initiatives reflect UM's strong sense of social responsibility and its proactive measures to alleviate hunger within the campus community.

Right: Poster of the Iftar food distribution initiative by Kesatuan Mahasiswa Universiti Malaya (KMUM)



2 Faculty-Led Food Bank and Food Support Programmes

Faculty of Languages and Linguistics

The Faculty of Languages and Linguistics (FBL), through Project B40 & Foodbank 3.0, successfully organised the third edition of its Foodbank Initiative on 18 January 2024, demonstrating the faculty's continuous commitment to student welfare and social responsibility. The programme involved the distribution of essential dry food items and snacks to students from the B40 income group, aiming to ease their financial burden and ensure that their basic needs are met.

This initiative, spearheaded by the FBL Student Union, represents a strong embodiment of empathy in action and highlights the faculty's proactive role in addressing issues of student food insecurity within the university community. Beyond providing immediate assistance, Project B40 & Foodbank 3.0 also fosters a sense of belonging and solidarity among students, encouraging a caring campus culture where peers look out for one another.



Above: Project B40 & Foodbank 3.0 Program at FBL

Faculty of Education

The Faculty of Education continued its long-standing annual tradition of organising the Bubur Lambuk & Iftar Perdana 2024 Programme, held in conjunction with the holy month of Ramadan. This meaningful initiative serves as a platform to strengthen unity and foster the spirit of togetherness among staff and students.

The programme was made possible through the collaborative efforts of the Faculty's Staff Welfare Club (Kelab Kebajikan Kakitangan Fakulti Pendidikan) together with various student associations, including the PhD Student Association, Undergraduate Student Association (Persatuan Pelajar DPP), TESL Student Association, Early Childhood Education Association (PAKK), and the Counselling Student Association.

Their teamwork and dedication were evident throughout the gotong-royong food preparation and distribution activities. This year, more than 600 servings of bubur lambuk were successfully distributed to members of the faculty community as well as students across Universiti Malaya, symbolising the values of compassion, generosity, and shared gratitude that define the spirit of Ramadan.

Faculty of Law

The Faculty of Law also played an active role in supporting student welfare during Ramadan through its meaningful charitable efforts. In 2024, the Islamic Students Association of Law (LISA) led an initiative to provide Ramadan kits and cash assistance to students from the B40 income group, helping to ease their financial burdens and ensure that they could observe the holy month with comfort and dignity. The programme also included the Iftar Perdana, a communal breaking-of-fast gathering that brought together students and staff, fostering a sense of unity, compassion, and gratitude within the faculty community.



Above: Islamic Students Association of Law (LISA) distributed food aid on Iftar Perdana

Residential Colleges Driving Student Welfare and Food Security

Residential colleges across Universiti Malaya (UM) play a vital and sustained role in addressing student hunger, promoting welfare, and nurturing community solidarity through various in-house programmes, food bank initiatives, and inclusive engagement activities. These efforts are instrumental in ensuring that all students, regardless of financial background, have access to adequate nutrition and emotional support, key components for their well-being and academic success.

First Residential College (KK1)

The First Residential College (Kolej Kediaman Pertama – ASTAR) continued its tradition of togetherness through the annual Iftar Perdana on 13 March 2024, the first day of Ramadan. The event offered free meals and beverages to residents and concluded with congregational prayers, fostering unity and spiritual reflection. Beyond festive gatherings, ASTAR also operates its own college food bank, providing ongoing food aid and essential supplies to students in need — reflecting the college's sustained commitment to student welfare.



Above: Iftar Perdana (left) and foodbank (right) at First Residential College

Third Residential College (KK3)

The Third Residential College (Kolej Kediaman Ketiga – KK3) took a proactive step in supporting students facing financial challenges by launching the “*Sarang Kebajikan Serigala*” initiative. Spearheaded by the College Welfare and Social Secretariat, this programme provides free daily essentials and food items accessible to students through the Student Storage Room near Dewan Gemilang Kurshiah. The initiative not only alleviates financial burdens but also fosters a culture of care and mutual assistance among the college community.

Sixth Residential College (KK6)

At the Sixth Residential College (Kolej Kediaman Keenam – KK6), innovation meets compassion through The Gastric Pit, a 24/7 shared cooking space established in collaboration with the University Malaya Medical Alumni Association. This initiative offers residents the convenience of preparing their own snacks and meals at any time, promoting food accessibility, healthy eating habits, and independent living skills. The space has become a focal point for student interaction and collaboration, encouraging a sense of ownership and responsibility within the residential community.



Above: Poster of Sarang Kebajikan Serigala programmes

Below: Opening ceremony of Gastric Pit in Sixth Residential College



Seventh Residential College (KK7)

The Seventh Residential College (Kolej Kediaman Ketujuh – KK7) operates the Gerobok Zaba Foodbank, an initiative made possible through direct contributions from the Pusat Pungutan Zakat (PPZ) in the form of regular food supply donations.

In addition to providing basic food aid, KK7 also champions cultural inclusivity through events such as the Chinese New Year Mandarin Orange Distribution Programme, reflecting the college's commitment to fostering harmony, diversity, and unity among its residents.



Above: Seventh Residential College foodbank programme

Ninth Residential College (KK9)

The Ninth Residential College (Kolej Kediaman Kesembilan – KK9) carried out “*Nine Prihatin*,” a welfare initiative focused on student well-being and community care. In collaboration with the Federal Territories Islamic Religious Council (MAIWP) and Universiti Malaya’s Student Affairs Department (HEP), the programme aimed to ease food insecurity and nurture empathy among residents.

From 5–15 December 2024, more than 150 students received packed meals, bread, and essential food items to meet their immediate nutritional needs. Besides providing support, the initiative strengthened solidarity and social responsibility among participants. This effort reflects KK9’s proactive commitment to student welfare and highlights the value of cross-agency collaboration in sustaining long-term support systems within Universiti Malaya.



Above: Distribution of food items to student

Strengthening Care Through Nutrition Support for UMMC Staff

At the Universiti Malaya Medical Centre (UMMC), several key interventions are implemented to ensure the nutritional well-being, performance, and morale of hospital staff, particularly those engaged in high-demand medical and support roles. Recognising that adequate nutrition is essential to both health and productivity, UMMC has established structured meal provision systems managed by the Department of Dietetics, with a strong focus on food safety, hygiene, and dietary balance.

One of the centre's core initiatives is the provision of daily lunch meals for Operating Theatre (OT) staff, fully funded by the hospital. These meals are carefully planned by qualified dietitians to be halal, balanced, clean, safe, and of high nutritional quality, catering to the diverse dietary needs of staff members. The menu operates on a nine-day rotation, with both regular and vegetarian options provided to encourage dietary variety. Each day, approximately 80 meal packs are freshly prepared and distributed in food-grade disposable containers to ensure hygiene and convenience. In compliance with hospital safety standards, the appointed food contractor is required to submit food samples for microbiological testing twice a year, ensuring continuous monitoring of food quality and adherence to strict safety protocols. This initiative not only safeguards the physical well-being of the surgical and medical teams but also acknowledges their critical contribution to patient care.



In addition to regular meal provisions, UMMC allocates a yearly-funded dry ration and meal budget for on-call staff, recognising the long and irregular hours often required in medical operations. This initiative, managed by the Dietetic Department, ensures that healthcare workers have access to nutritious, convenient, and safe food options during extended shifts. The rations typically include high-fibre biscuits, wholemeal bread, cereal-based beverages, and low-fat or skimmed milk, all designed to provide sustained energy and maintain alertness. Beneficiary departments include Nursing, Emergency Medicine, Security, Pharmacy, Engineering, Forensic Pathology, Biomedical Imaging, Pathology/Laboratory Medicine, and Operations, among others. By addressing the nutritional needs of on-call staff, this initiative enhances energy levels, concentration, and overall staff satisfaction, ensuring optimal performance even during demanding work conditions.

Furthermore, UMMC has implemented a hospital-funded hospitality budget dedicated to the provision of healthy and high-quality food during meetings and official gatherings across its 48 departments and units. Managed by the Department of Dietetics, this initiative ensures that all meeting meals are aligned with Healthy Meeting Guidelines, promoting a consistent culture of wellness within the hospital's professional environment. By offering nutritious options instead of high-calorie or processed foods, UMMC encourages healthier eating habits among its workforce and integrates nutrition awareness into everyday work settings.

Left: Free pack food for UMMC staff

Access to Knowledge, Skills, and Technology for Local Farmers and Food Producers

Ensuring local farmers and food producers have access to knowledge, sustainable agricultural and aquaculture practices, and modern technologies is central to achieving SDG 2: Zero Hunger. Strengthening community capacity for responsible and efficient food production supports national food security while enhancing rural livelihoods and socio-economic resilience. Universiti Malaya (UM) supports this mission through knowledge transfer programmes that equip farmers and aquaculture practitioners with practical skills and updated technologies.

By collaborating with government agencies, industry experts, and local communities, UM expands opportunities for adopting sustainable practices, ensuring scientific advancements are shared widely and inclusively with those driving food production. Refer to the topic “Educational Outreach on Sustainable Land Management for Agriculture” under SDG 15, page 303 - 310, for additional agriculture-related events.

Aquaculture Related Events: IOES Scientific Seminar Series – Sustaining Seaweed Aquaculture

The Institute of Ocean and Earth Sciences (IOES) organised a seminar, “Sustaining Seaweed Aquaculture”, highlighting its importance for nutrition, livelihoods, and ecosystem services in Malaysia’s coastal communities. Marine scientists, producers, entrepreneurs, and policymakers shared knowledge on sustainable cultivation, post-harvest processing, and ecological management, emphasising biodiversity, pollution reduction, and environmentally responsible practices.

The seminar also explored market potential for seaweed-based products in food, pharmaceuticals, and biodegradable materials, showing how sustainable aquaculture can boost local income and economic diversification. By fostering collaboration between academia, industry, and coastal communities, the initiative reinforced Universiti Malaya’s role in advancing the blue economy and promoting knowledge transfer for conservation and food security.



Above: Poster of IOES Scientific Seminar Series – Sustaining Seaweed Aquaculture

Glami Lemi Biotechnology Research Centre

Ensuring access to food security knowledge, skills, and technology among local farmers and food producers is vital to achieving Sustainable Development Goal (SDG) 2: Zero Hunger, particularly in strengthening local agricultural systems, promoting sustainable production practices, and enhancing community resilience. Universiti Malaya (UM), as a premier institution of higher learning and a driver of sustainable innovation, continues to play a pivotal role in empowering communities through agricultural education, knowledge transfer, and technology dissemination.

One notable initiative is the Small Ruminant Management and Breeding Training (LPPRK) Series 3/2024, organised by the Glami Lemi Biotechnology Research Centre (PPBGLUM) in collaboration with the Negeri Sembilan Department of Veterinary Services. This program, held from 8 to 9 June 2024, brought together 26 small ruminant farmers from across Negeri Sembilan to enhance their technical and practical understanding of modern livestock production systems.

The two-day intensive training introduced participants to assisted breeding technologies, emphasizing innovative methods to improve livestock productivity and genetic quality. Farmers also gained exposure to veterinary health management, disease prevention, feed optimization, and animal welfare practices, all critical components in ensuring the sustainability and profitability of small ruminant farming. Beyond technical instruction, the program fostered a collaborative learning environment, enabling farmers to share challenges and best practices while strengthening linkages with experts and government agencies.

By providing a platform for knowledge exchange between academia, industry, and local communities, PPBGLUM's initiative underscores UM's commitment to bridging the gap between scientific research and real-world agricultural application. Such capacity-building programs not only improve farmers' livelihoods but also contribute to national goals in food security, rural development, and sustainable livestock management.

Below: Activities during Small Ruminant Management and Breeding Training (LPPRK) Series 3/2024



UM Empowers Communities to Produce Organic Plant Materials

In addition to research and livestock-focused initiatives, Universiti Malaya (UM) extends its expertise in food security, sustainable agriculture, and environmental stewardship to urban and peri-urban communities. These outreach activities demonstrate UM's proactive role in sharing scientific knowledge, practical skills, and sustainable technologies with local farmers, food producers, and residents to strengthen community resilience and promote sustainable food systems.

This hands-on approach empowered local participants with the knowledge and technical skills to grow their own food using environmentally responsible methods. It also promoted circular resource use, reducing organic waste generation and dependence on external food sources. The programme thus served as both an educational and capacity-building platform, connecting academic expertise with real-world community applications.

On 8 September 2024, the initiative “Strategi Menjamin Pencapaian Sekuriti Makanan Melalui Transformasi Sisa Kebun Kepada Biochar-Kompos (KOMBI)” was implemented in Kepong. UM researchers and students collaborated with local residents to educate them on organic waste recycling and sustainable urban farming practices. Participants learned to convert household organic waste into biofertilisers and compost, which were then used to grow vegetables and herbs in community and home gardens.



Above: A gardener producing organic matter from biochar and compost

Below: Assoc. Prof. Dr. Rosazlin (right) pictured with Universiti Malaya staff and the Sungai Keroh Mutiara Magna community in Kepong, Kuala Lumpur



Strengthening Skills and Partnerships Among Local Farmers and Food Producers

Universiti Malaya (UM) remains committed to supporting Sustainable Development Goal (SDG) 2: Zero Hunger through its ongoing efforts to engage, educate, and empower local farmers and food producers. By organizing and participating in diverse events across agricultural and aquaculture fields, UM acts as a bridge between scientific innovation and community application, enabling sustainable food production, responsible resource management, and resilient local economies.

In 2024, UM hosted and collaborated on a series of impactful agriculture and aquaculture events designed to foster knowledge transfer, strengthen networks, and build local capacity for sustainable practices.

Faculty Science Open Day – Community Engagement through Agricultural Innovation

The Glami Lemi Biotechnology Research Centre (PPBGLUM) proudly participated in the Faculty of Science (FS) Open Day, where a wide range of research, technology, and agricultural innovations were showcased to the broader public. The event served as a dynamic platform for farmers, small-scale producers, and community members to engage directly with Universiti Malaya researchers and students. Through interactive exhibitions, demonstrations, and knowledge-sharing sessions, participants were introduced to the latest advancements in biotechnology applications such as sustainable crop cultivation, organic waste utilization, and biofertilizer development that can enhance agricultural productivity while preserving environmental health.

This initiative not only highlighted UM's commitment to advancing agricultural innovation but also strengthened the bridge between academic research and community practice. The collaboration with the UM Biotechnology Club further underscored the university's strong culture of student-led engagement and empowerment through scientific outreach. In line with UM's sustainability agenda, the FS Open Day contributed to broader efforts to create accessible events and learning opportunities for local farmers and food producers. Such initiatives facilitate the exchange of knowledge, promote adoption of sustainable farming technologies, and support the growth of resilient, environmentally responsible agricultural communities.

Below: Faculty Science Open Day



Held at The Cube, KPPI Building on 14 October 2024, this stakeholder engagement session was led by Dr. Zuliana Razali, with the support of Dr. Mohd Fadhli Hamdan, Dr. Nurzatil Sharleeza Mat Jalaluddin, and Ms. Nor Nadirah Abd Hamid from the Centre for Research in Biotechnology for Agriculture (CEBAR). The session aimed to strengthen understanding and acceptance of biostimulants among Malaysian farmers as a sustainable and environmentally friendly alternative to conventional chemical fertilizers.

The event convened a diverse group of stakeholders, including representatives from the Department of Agriculture (DOA), Malaysian Agricultural Research and Development Institute (MARDI), Malaysia Pepper Board (MPB), Lembaga Pertubuhan Peladang (LPP), and private sector partners such as IBG Manufacturing Sdn. Bhd., INO Nature Sdn. Bhd., and LKB Group Sdn. Bhd. Through interactive discussions and evidence-based sharing of data from prior farmer perception surveys, participants collaboratively identified key barriers to biostimulant adoption—such as cost constraints, limited awareness, and inconsistent product knowledge.

The dialogue fostered by this session provided a valuable platform for cross-sector collaboration between researchers, government agencies, and industry players. It also facilitated the co-creation of strategies to improve farmer education, policy support, and market accessibility for sustainable agricultural products. This initiative reflects Universiti Malaya's continued effort to engage directly with local and national agricultural stakeholders, bridging the gap between scientific innovation and practical implementation to support Malaysia's transition towards eco-efficient and resilient farming systems.



Right: CEBAR stakeholder engagement session

CEBAR Expert Seminar Series 2/2024 – Sustainable Agriculture & Water Technology for Sustainability

Organised by the Centre for Research in Biotechnology for Agriculture (CEBAR), this seminar provided a high-level knowledge exchange platform focusing on innovations in sustainable agriculture and water technology. Bringing together researchers, farmers, policymakers, and agricultural entrepreneurs, the session explored critical topics such as precision irrigation systems, biotechnological applications in crop management, and bioresource utilization for enhanced productivity.

Discussions underscored the importance of adopting climate-resilient agricultural practices to safeguard food security while conserving water resources and protecting natural ecosystems. By facilitating dialogue between academia and industry, the seminar supported knowledge transfer and collaboration toward developing sustainable agricultural systems. Together with community-oriented events such as the FS Open Day, the CEBAR seminar exemplifies UM's holistic approach to engaging local farmers and food producers—bridging scientific innovation with practical implementation to foster a sustainable, resilient food system.

CENTRE FOR RESEARCH IN BIOTECHNOLOGY FOR AGRICULTURE (CEBAR) PRESENTS
CEBAR EXPERT SEMINAR SERIES 2/2024

7 MAR 2024 | **TIME** 2:30 PM - 4:00 PM (MALAYSIA TIME) | **ONLINE SESSION**
LINK: [HTTPS://MSTEAMS.LINK/GLYL](https://msteams.link/glyl)

PRESENTER #1
 ASSOC. PROF. BALAKRISHNA S MADDODI
 (MANIPAL INSTITUTE OF TECHNOLOGY)

NANOBUBBLE GENERATOR FOR GREEN AND SUSTAINABLE AGRICULTURAL AND AQUACULTURE APPLICATIONS

In response to the growing demand for green, sustainable and efficient solutions in agricultural and aquaculture industries, we present a novel nanobubble generator with a patent-worthy design. Nanobubbles, which are ultrafine bubbles with diameters on the nanometer scale, hold tremendous potential in enhancing various processes crucial to the productivity and green environmental sustainability of these sectors. The proposed nanobubble generator leverages cutting-edge nanotechnology and innovative engineering principles to produce a stable and high-density stream of nanobubbles. Our design ensures a consistent nanobubble size distribution, with diameters typically ranging from tens to hundreds of nanometers. The implementation of our nanobubble generator in green and sustainable agricultural spaces promise to revolutionize irrigation practices. Nanobubbles have shown remarkable capabilities in improving water infiltration, soil oxygenation, and nutrient uptake, leading to higher crop yields and reduced water consumption. For aquaculture applications, the nanobubble generator holds immense potential in promoting the health and growth of aquatic species. The tiny bubbles carry dissolved oxygen efficiently, alleviating oxygen deficiencies in densely stocked aquaculture systems. Our nanobubble generator design not only presents a ground-breaking technological advancement but also addresses critical environmental challenges faced by these industries. Our patentable nanobubble generator has the potential to revolutionize green sustainable agricultural and aquaculture industries by significantly improving productivity, resource efficiency, and ecological sustainability.

PRESENTER #2
 MR. AMIT KAPUR
 (MANIPAL INSTITUTE OF TECHNOLOGY)

NANOBUBBLE TECHNOLOGY AND INDUSTRIAL APPLICATIONS - A FUTURE WATER TECHNOLOGY FOR SUSTAINABILITY

Nanobubble technology holds promise for various industrial applications, particularly in enhancing water sustainability efforts. Here's how it can contribute:

- Water Treatment:** Nanobubbles can be employed in water treatment processes to improve the efficiency of removing contaminants such as heavy metals, organic pollutants, and pathogens. Their small size and high surface area facilitate better interaction with pollutants, leading to more effective treatment.
- Agriculture:** In agriculture, nanobubbles can be infused into irrigation water to enhance soil health and crop yield. They can improve oxygen levels in the soil, stimulate root growth, and increase nutrient uptake by plants, thereby reducing the need for chemical fertilizers and promoting sustainable farming practices.
- Aquaculture:** Nanobubbles offer potential benefits in aquaculture by increasing dissolved oxygen levels in water, which is crucial for the health and growth of aquatic organisms. Improved oxygenation can help prevent fish kills, enhance fish growth rates, and mitigate the build-ups of toxic substances in aquaculture ponds or tanks.
- Food and Beverage Industry:** In the food and beverage industry, nanobubbles can be utilized for various purposes such as sterilization, wastewater treatment, and enhancing the quality of food and beverages. They can help remove impurities, extend the shelf life of products, and improve overall product quality while reducing the need for chemical additives.
- Mining and Metal Extraction:** Nanobubbles can be used in mining and metal extraction processes to facilitate the flotation of minerals from ore. By generating a high concentration of nanobubbles, the efficiency of flotation processes can be increased, leading to higher recovery rates of valuable minerals and reduced environmental impact.
- Oil and Gas Industry:** In the oil and gas industry, nanobubble technology can be applied in processes such as enhanced oil recovery and wastewater treatment. Nanobubbles can help improve the efficiency of oil extraction operations and aid in the removal of contaminants from produced water, thereby minimizing environmental pollution.

Overall, nanobubble technology holds great promise for advancing water sustainability efforts across various industrial sectors by improving water treatment processes, enhancing agricultural practices, and promoting environmentally friendly solutions in various applications.
 Key word: water treatment, nanobubbles technology, water sustainability

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Above: Poster of CEBAR Expert Seminar Series 2/2024 – Sustainable Agriculture & Water Technology for Sustainability

Community-Based Project – Vegetable Cultivation by OKU Participants

This community-based initiative was designed to empower Persons with Disabilities (OKU) through hands-on agricultural training and inclusive participation in sustainable food production at Akademi Permata Impian (APIM), Semenyih, Selangor. The project introduced participants to a structured learning pathway consisting of four key modules namely vegetable planting, plant care and monitoring, composting, and digital marketing to provide both technical and entrepreneurial skills in agriculture.

Throughout the programme, participants actively engaged in practical sessions such as seedling transplantation, soil preparation, pest management, and harvesting, supported by facilitators and agricultural trainers. Beyond technical instruction, the project also emphasised environmentally responsible farming practices, highlighting composting as a method to recycle organic waste and maintain soil health.

Right: Recipient of the 2024 Community Garden Project grant, Dr. Maisarah Hasbullah

Below: Community-based project on vegetable cultivation involving OKU participants

This initiative not only strengthened participants' agricultural knowledge but also fostered social inclusion, self-reliance, and economic empowerment among vulnerable groups. By integrating sustainability education with inclusive capacity building, the programme exemplifies Universiti Malaya's commitment to ensuring that opportunities for learning, livelihood, and environmental stewardship are accessible to all segments of society. It also contributes to broader institutional goals under SDG 2 (Zero Hunger) and SDG 10 (Reduced Inequalities), while promoting community resilience through sustainable agriculture.



UM Advancing Sustainable Farming Practices for Local Communities

Universiti Malaya (UM) continues to strengthen its role as a national leader in advancing sustainable agriculture and biotechnology innovation.

Through the provision of access to state-of-the-art research facilities, laboratories, and technological expertise, UM empowers local farmers, agri-entrepreneurs, and food producers to adopt science-based, sustainable farming practices. UM provides access to university facilities to local farmers and food producers to improve sustainable farming practices.

The university's facilities managed primarily under the Centre for Research in Biotechnology for Agriculture (CEBAR) serve as key enablers for knowledge exchange, technology transfer, and capacity building within Malaysia's agricultural sector

These facilities not only support academic research but also open their doors to external collaborators, industry partners, and local farming communities seeking to enhance productivity, ensure food safety, and embrace environmentally responsible agricultural methods.

Molecular Biology Laboratory – Strengthening Research Capacity and Knowledge Transfer in Agricultural Biotechnology

The Molecular Biology Laboratory, housed under the Centre for Research in Biotechnology for Agriculture (CEBAR), is a vital research and training facility that supports Universiti Malaya's mission to advance modern agricultural biotechnology and sustainable crop management. Equipped with state-of-the-art instruments such as quantitative Real-Time PCR systems, spectrophotometers, gel documentation units, and 2D gel electrophoresis platforms, the laboratory facilitates both fundamental and applied molecular research essential for enhancing crop health, yield, and resilience to environmental stressors.

The laboratory regularly hosts customized workshops and training sessions in areas such as molecular diagnostics, genetic diversity analysis, biosafety protocols, and DNA-based crop identification. These programmes are designed to strengthen technical competencies among users while ensuring that scientific advances are translated into practical, field-level expertise.

Through this sustained effort, the Molecular Biology Laboratory plays a pivotal role in expanding Malaysia's agricultural research and innovation capacity. By empowering local producers, agronomists, and start-ups to apply molecular insights in crop management and breeding, the laboratory contributes to the national goals of achieving sustainable, high-value, and data-driven farming systems.

Beyond serving the university's research community, the Molecular Biology Laboratory operates on an open-access and collaborative model, providing facilities and technical expertise to associate partners, farmers' cooperatives, agricultural agencies, and biotechnology enterprises. This inclusive approach encourages the co-creation of solutions and promotes the direct application of molecular tools in agriculture.

Plant Biotech Facility (PBF) - Advancing Sustainable Agriculture through Biotechnology Access

The Plant Biotech Facility (PBF), established on 1 December 2009, stands as a cornerstone of Universiti Malaya's commitment to advancing plant biotechnology and biosafety research. Designed and constructed in full compliance with International Biosafety Standards at Physical Containment Level 2 (PCL-2), the PBF enables both fundamental and applied research in transgenic plants, crop improvement, and biosafety management. The facility is a gated, certified complex that undergoes annual inspections to ensure adherence to biosafety protocols aligned with Australian and New Zealand containment guidelines.

Comprising three state-of-the-art greenhouses, the PBF offers independently controlled environmental systems that simulate diverse climatic conditions suitable for a variety of plant species. Each greenhouse is equipped with advanced infrastructure, including:

- Air-conditioning, humidifiers, and thermal screens for precise environmental regulation.
- Twin-walled polycarbonate glazing to optimize insulation and light transmission.
- An automated building management system featuring temperature, humidity, irrigation, and fertigation control.
- Comprehensive safety mechanisms such as emergency showers, eye-wash stations, sterilization units, and automated waste treatment systems.
- Secure access via biometric (thumbprint) verification to maintain biosafety integrity.

Beyond serving as a premier research facility for UM academics and students, the PBF extends its services to external stakeholders, including local farmers, agrotech start-ups, and agricultural industry collaborators. Through this inclusive approach, the facility provides:

- Controlled spaces for growing and monitoring biotechnologically enhanced plants.
- 24-hour climate and biosafety monitoring support.
- Training, consultancy, and research partnership programmes to facilitate knowledge transfer and skill development.
- Sustainable biological waste management systems ensuring compliance with environmental safety standards.

By providing access to cutting-edge laboratory infrastructure, technology, and plant resources, the PBF enables local agricultural producers and entrepreneurs to experiment, innovate, and refine sustainable farming solutions. This collaboration bridges scientific research with community application—supporting the development of resilient crops, efficient production systems, and biosafe agricultural technologies. Ultimately, the PBF exemplifies Universiti Malaya's role in strengthening university–industry–community linkages and advancing sustainable agriculture through shared access to innovation and expertise.

Below: Plant Biotech Facility (PBF)



Plant Biotechnology Incubator Unit (PBIU) – Accelerating Innovation and Technology Transfer in Agriculture

Complementing the capabilities of the Plant Biotech Facility (PBF), the Plant Biotechnology Incubator Unit (PBIU) functions as an innovation hub that bridges academic research and real-world agricultural applications. Established under the Centre for Research in Biotechnology for Agriculture (CEBAR), the PBIU advances market-driven and knowledge-driven (K-driven) research and development, focusing on translating scientific discoveries into practical solutions that directly benefit farmers, agribusinesses, and local communities.

The PBIU plays a pivotal role in supporting biotechnology startups, agricultural entrepreneurs, and small producers through a range of targeted programmes and services, including:

- Training and capacity-building programmes in plant biotechnology, biosafety, and agricultural innovation to enhance technical skills and awareness of sustainable practices.
- Research contracts and consultancy services that assist local producers and industry partners in adopting modern biotechnology tools for improved crop productivity and resilience.
- Hatchery and incubation services, where innovative agricultural concepts are developed, tested, and refined before being scaled up for commercial or community implementation.

By serving as a bridge between scientific discovery and field application, the PBIU empowers farmers and agrotechnology enterprises to enhance yield, improve crop quality, and adopt climate-smart, resource-efficient farming techniques. Its focus on rapid technology transfer ensures that cutting-edge agricultural solutions, such as biofertilizers, biostimulants, and improved plant varieties are deployed effectively to address real-world agricultural challenges.

Through these efforts, the PBIU reinforces Universiti Malaya's mission to facilitate access to university research facilities, technology, and expertise for local farmers and food producers. The unit's initiatives contribute to sustainable food production, rural economic growth, and the national agenda of building a resilient and innovation-driven agricultural sector.



Above and below: Plant Biotechnology Incubator Unit (PBIU)

