

國科會生命科學研究推動中心

研討(習)會 結案報告

一、基本資料

中文名稱	2025 GEAR-UP FORUM
英文名稱	2025 GEAR-UP FORUM
中文摘要報告	<p>國立中興大學國際農業中心於 11 月 17 至 18 日舉辦「2025 GEAR-UP Forum & 2025 Norman Borlaug Lecture Series」，邀請美國德州農工大學 (Texas A&M University)、菲律賓大學及多位國內學者，共同探討環境永續、農業科學、智慧農業與獸醫畜牧等議題。本活動獲國科會及教育部計畫支持，透過跨國學術交流，促進我國農業科技與永續發展的探討。 2025 GEAR-UP Forum 第一天論壇以「Innovating Sustainable Agriculture through Science and Technology」為主題。國內學者分享包括：臺師大方偉達教授提出藍碳生態系對氣候調適的作用；興大林浩廷副教授以深度學習預測雞隻生長與死亡率，提高養殖效率；興大鄭舒允助理教授研究絲瓜萎凋病抗病機制，揭示化學防禦與細胞壁加固兩種策略；臺大林詩舜教授介紹 RNA 沉默技術對抗植物病毒的研究成果。德州農工大學學者 Dr. James J. Cai 介紹單細胞 RNA 定序分析策略；Dr. Arum Han 分享高通量微液滴微流控技術在單細胞篩選中的應用；Dr. Pao Tai Lin 展示微型光譜晶片檢測呼吸生物標誌物與遺傳標靶的方法，提升現場檢測效率。 2025 Norman Borlaug Lecture Series 第二天與德州農工布勞格國際農業研究所 (The Borlaug Institute) 合作，邀請學者演講，包括：Dr. Amit Dhingra 介紹生物炭應用及作物水分管理策略；Dr. Ariun Ishdorj 分析資訊通信技術 (ICT) 對農業市場的影響；Dr. Courtney Daigle 分享精準畜牧與多元資料整合提升動物福利的經驗；Dr. Gerard D' Souza 介紹 PVAMU 跨領域研究團隊在環境永續與氣候適應的教育與研究計畫。中興大學副校長周濟眾表示，長期與德州農工大學合作不僅促進學術交流，也為亞太地區農業永續注入新動能。未來將持續整合國內外資源，推動國際合作，為全球糧食安全與永續發展貢獻力量。</p>

The International Agriculture Center of National Chung Hsing University (NCHU) hosted the 2025 GEAR-UP Forum & 2025 Norman Borlaug Lecture Series on November 17–18. Scholars from Texas A&M University, the University of the Philippines, and multiple institutions across Taiwan were invited to discuss key issues in environmental sustainability, agricultural science, smart agriculture, and veterinary sciences. Supported by the National Science and Technology Council and the Ministry of Education, the event strengthened transnational academic exchange and advanced Taiwan's efforts in sustainable agricultural innovation.

2025 GEAR-UP Forum

The first day centered on the theme “Innovating Sustainable Agriculture through Science and Technology.” Taiwanese scholars presented research spanning blue carbon ecosystems and climate adaptation, deep-learning prediction of poultry growth and mortality, disease-resistance mechanisms in loofah wilt, and RNA silencing for plant virus control. Texas A&M University researchers introduced advances in single-cell RNA sequencing strategies, high-throughput microdroplet microfluidics for cell screening, and miniaturized spectrometric chips for detecting respiratory biomarkers and genetic targets.

2025 Norman Borlaug Lecture Series

On the second day, in collaboration with the Borlaug Institute, invited speakers addressed topics including biochar applications and crop water management, the impact of ICT on agricultural markets, data-driven precision livestock approaches to improve animal welfare, and interdisciplinary programs on environmental sustainability and climate resilience at PVAMU.

	<p>NCHU Vice President Chou emphasized that the long-standing partnership with Texas A&M University continues to invigorate agricultural sustainability efforts in the Asia-Pacific region. Looking ahead, NCHU will further integrate domestic and international resources to promote global collaboration and contribute to food security and sustainable development worldwide.</p>
<p>研討(習)會目的</p>	<p>國立中興大學國際農業中心自 103 年開始每年舉辦 GEAR UP 國際論壇，已建立台、美與泰國、越南、印尼、菲律賓等東南亞等國家之對話平台。108 年組成 International Rural-Up Partnership，確立本校、美國德州農工大學與東南亞 5 校之農村再生夥伴關係，並重啟與亞洲農業院校協會(Asian Association of Agricultural Colleges and Universities, AAACU)關係，聯合猶他州立大學共同舉辦暑期海外學程「NCHU 2019 SummerUni+ Program」。</p> <p>同年，為落實雙邊農業推廣的具體合作之目標作籌備，利於提升農業相關的教學、研究、推廣國際合作成效，發揮國際影響力，提升本校國際地位，本校國農中心與「亞太農業研究機構聯盟」(APAARI)簽署成立 APAARI 價值鏈卓越中心(Centre of Excellence on Value Chains, COE on value chain)。112 年突破疫情限制，實體辦理會議並邀請美國德州農工大學、泰國農業大學等學者，共同探討水資源與食物安全等相關議題。培育國際競爭力之優秀農業科學及生技人才已成為重要趨勢。</p> <p>本中心於 2015 年與標竿學校 TAMU 的布勞格國際農業研究所 (Norman Borlaug Institute for International Agriculture，簡稱 The Borlaug Institute) 成立聯合中心，期許攜手探討&解決台灣和全球與生態、農業和鄉村發展相關問題。此合作關係不僅延續諾曼布勞格學者的精神，同時亦增加學生的國際農業推廣視野，打破現有疆界限制，為本校教學注入新鮮活力。諾曼布勞格 (Norman Ernest Borlaug) 是美國生物學家，培育出 20 多種矮稈、高產、抗病小麥品種，在亞洲和非洲推廣高產小麥和現代農業生產技術，於 1965-1970 年間成功讓巴基斯坦和印度產量增加了一倍，讓千百萬人免於飢餓，更是榮獲 1970 年諾貝爾和平獎及「綠色革命之</p>

	<p>父」的稱號。本子計畫以推廣 Dr. Norman Borlaug 之壯舉，自 108 年起零星場次的演講，讓本校師生們對於諾曼布勞格有些許的認識，109-111 年因受到新型冠狀病毒肺炎對美國影響，採線上視訊方式進行演講。截至 113 年止，共邀請位標竿學校 TAMU 布勞格國際農業研究所的優秀講師 30 人次，透過不同角度探討全球農業、生態發展景況、COVID-19 與全球飢餓、培育農業管理人才等。本計畫擬辦理 2025 GEAR-UP FORUM 國際論壇，第一天主題為「Innovating Sustainable Agriculture through Science and Technology」，將以 Agriculture Science、Environment and Sustainability、Veterinary and Animal Husbandry、Smart Agricultural Technology 四大主題為主軸，分享相關領域的最新創新、趨勢和關注點；第二天將邀請美國德州農工大學布勞格國際農業研究所 (Norman Borlaug Institute for International Agriculture) 之學者前來，針對農業、糧食與生態等相關的國際議題，如永續農業、氣候變遷、食品安全、動物健康等進行演講，持續南向推進農業專業發展。透過實質執行兩校聯合中心宗旨，邀請各國學者共同參與，拓展師生國際視野並了解農業研究之最新趨勢，增加我國國際能見度，促進我校與美國及東南亞國家學校之交流，以利討論學術交流與共同研究，增進未來共同研究發表之可能性。</p>
<p>參加對象(含人數)</p>	<p>參加對象包含國內外農學領域學者及本校學生師長 兩日活動共計 410 人次</p>
<p>預期效益達成狀況</p>	<p>本中心於 11 月 17 至 18 日舉辦「2025 GEAR-UP Forum & 2025 Norman Borlaug Lecture Series」，兩日活動共吸引 410 人次參與，展現高度關注度與海內外學術界的積極回應。本次論壇除邀請美國德州農工大學 (Texas A&M University) 多位學者與會外，亦特別邀請 菲律賓大學副校長及 UAAT 國際合作計畫聯盟學者參與，成功促成跨國、跨領域的知識交流並深化合作關係。</p> <p>活動期間透過多場專題演講與技術分享，不僅促進本校與國際學界在農業科技、永續發展、智慧農業、畜牧與獸醫科學等面向的深度交流，更有效拓展本校國際研究能量，強化臺灣在亞太農業科技領域的知識樞紐地位。</p> <p>此外，本論壇亦成功串聯跨國組織與研究團隊，為未來合作奠定明確方向，包括：共同研究計畫、師生雙向交流、國際訪問與聯合科</p>

	<p>研布局等。透過本次建立的人脈網絡與策略夥伴關係，預期將持續推動農業科技創新，並對全球糧食安全與永續農業發展帶來長期而深遠的效益。</p> <p>1. 舉辦 2025 GEAR-UP FORUM 國際研討會，邀請至少五位國際知名學者擔任講者。：達成</p> <p>2. 預計吸引超過 400 名參與者，涵蓋國內外專家、學者、教師及學生，促進跨領域學術交流。：達成</p>
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二、邀請主講人姓名及學經歷

姓名	學歷	經歷	現任
Ambassador Eric M. Bost			Deputy Director for Financial Operations & External Relations of the Borlaug Institute, Texas A&M University.
Rossana Marie C. Amongo			Vice Chancellor, University of the Philippines Los Baños (UPLB)
Szu-Hung Chen			Assistant Professor, International Master Program of Agriculture (IMPA), NCHU.
Wei-Ta Fang			Distinguished Professor and Vice Dean, Graduate Institute of Sustainability Management and Environmental Education, College of Science, NTNU.
Hao-Ting Lin			Associate Professor and Director, Department of Bio-industrial Mechatronics Engineering, Agricultural Machinery Workshop, NCHU.
Yi Chun Pan			Associate Professor,

			Department of Horticulture, NCHU.
Shu Yun Chen			Assistant Professor, Department of Agronomy, NCHU.
Chuan-Kai Ho			Professor, Institute of Ecology and Evolutionary Biology National Taiwan University, NTU.
Shih Shun Lin			Professor, Institute of Biotechnology, NTU.
Dai Yu Chao			Professor, Graduate Institute of Microbiology and Public Health, College of Veterinary Medicine, NCHU.
Fang Chia Chang			Distinguished Professor, Department of Veterinary Medicine, NTU.
James J. Cai			Professor, Department of Veterinary Medicine & Biomedical Sciences Affiliated Faculty, Electrical & Computer Engineering, Texas A&M University.
Ching-Chou Wu			Distinguished Professor, Department of Bio-industrial Mechatronics Engineering, NCHU.
Arum Han			Professor and Associate Dean for Research, Department of Electrical and Computer Engineering, Biomedical Engineering, Chemical Engineering, Texas A&M

			University .
Pao-Tai Lin			Associate Professor, Department of Electrical & Computer Engineering, Materials Science & Engineering, Texas A&M University .
Tsung-Chi Cheng			Professor, Department of Biomechatronics Engineering, NTU.
Amit Dhingra			Professor and Department Head, Department of Horticultural Sciences, Texas A&M University.
Ariun Ishdorj			Associate Professor, Department of Agricultural Economics, Texas A&M University.
Courtney Daigle			Associate Professor, Department of Animal Science, Texas A&M University.
Gerard D' Souza			Dean, College of Agriculture and Human Sciences, Prairie View A&M University.
Jack Elliot			Professor and Regional Director for Africa, Senior Scientist, Norman Borlaug Institute for International Agriculture & Development.

三、議程

日期	議程時間	議程講員	議題主題
114/11/17	0915-0940	Wei-Ta Fang	Blue Carbon and Coastal Inventory: Scientific Basis and Sustainable Potential
114/11/17	0940-1005	Hao-Ting Lin	Feature-Driven Predictive Optimization for Growth Performance and Mortality Management in Poultry Farming Environments
114/11/17	1030-1055	Shu Yun Chen	Development of Molecular Markers for Fusarium Wilt Resistance and Elucidation of Broad-Spectrum Defense Mechanisms in Luffa Using Single-Plant GWAS and RNA-seq
114/11/17	1055-1120	Chuan-Kai Ho	A comparative pest study of fall armyworm in native Texas and invaded Taiwan
114/11/17	1120-1145	Shih Shun Lin	Exploring the Autonomous Regulatory Mechanisms of RNA Silencing through Plant-Virus Interactions
114/11/17	1400-1425	Fang Chia Chang	Novel ENT1 inhibitor attenuates Alzheimer's pathogenesis and improves cognitive and sleep outcomes Dr. Fang Chia Chang
114/11/17	1425-1450	James J. Cai	Beyond Differential Expression: Expanding the Analytical Toolbox for Single-Cell RNA-Seq

114/11/17	1510-1535	Arum Han	High-throughput droplet microfluidics for identifying useful microorganisms from environment
114/11/17	1535-1600	Pao-Tai Lin	Integrated Photonic Circuits for Chip-scale Detection of Biomarkers & Biomolecules
114/11/17	1600-1625	Tsung-Chi Cheng	Determination of carbon cycle enzymes activity as a microbial indicator of soil health using sensors
114/11/18	0910-0950	Amit Dhingra	Water and Horticultural Crop Production
114/11/18	0950-1030	Ariun Ishdorj	The Impact of Information and Communication Technologies on Agricultural Development
114/11/18	1040-1120	Courtney Daigle	Changing technologies on a changing planet: Using science and technology to increase thermotolerance, efficient water use, and promote animal welfare
114/11/18	1120-1200	Gerard D' Souza	Food-Energy-Water Security and Sustainability: An Educational and Research Ecosystem toward building a "Premier, Public, Research-Intensive University that serves as a National Model for Student Success"
114/11/18	1200-1230	Jack Elliot	Closing remarks

四、活動照片和影片

- 照片(至少 10 張，請填寫照片說明)



圖一至二、2025 GEAR-UP FORUM 兩日大合照



圖三、開幕式及致贈儀式



圖四至六、學者演講及場次互動



圖七至九、場內參與狀況與來賓提問



圖十至十一、活動報到情形

- 影片(1-2 分鐘精華短片，請上傳至結案報告專區，並提供檔案名稱

檔案名稱：2025-GEAR-UP-成果影片-生推中心