

The UWA Institute of Agriculture



The opportunity to share their glasshouse experiments one-on-one with CGIAR Executive Managing Director Dr Ismahane Elouafi during her busy three-day visit to UWA in August was “research career defining” for our PhD students.

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THE UNIVERSITY OF
**WESTERN
AUSTRALIA**

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Front cover photo:

CGIAR's Dr Ismahane Elouafi in front of a UWA glasshouse with PhD students, the Institute Director Hackett Professor Kadambot Siddique, Adjunct Professor Jairo Palta and Business Manager Diana Boykett.

From the Director

What a pleasure it was to welcome my dear long-time friend Dr Ismahane Elouafi to the great State of Western Australia in August. In her first year as Executive Managing Director of the Consultative Group on International Agricultural Research, having stepped into the role in December 2023, Dr Ismahane has truly gone from strength to strength. Read about our valuable visit to UWA Farm Ridgefield (page 3) and her interactions with PhD researchers and delivery of the 30th Hector and Andrew Stewart Memorial Lecture (page 7).

A highlight of The UWA Institute of Agriculture's 2024 events calendar was our annual Industry Forum in July (page 5). The topic 'Can agriculture reach net zero?' was intelligently and passionately discussed during the forum, and I'm pleased to report that those conversations continued well into the evening at our networking sundowner. I extend my gratitude to the members of our Industry Advisory Board

for their excellent guidance in determining our topical theme and speakers.

While activities at the UWA Crawley campus have shown no sign of slowing down (turn to pages 8, 10, 12, 14 and 16 to read about additional recent lectures the Institute has hosted), I have also been fortunate to travel. Embracing the opportunity to present at my alma mater Kerala Agricultural University (page 4) and nurturing exciting new opportunities with our partners at the Indian Council of Agricultural Research-Indian Agricultural Research Institute in New Delhi (page 10) was most rewarding. Now that we are well into the second half of the year, I look forward to continuing to forging new and reinforcing long-term research partnerships both at home and overseas.

Hackett Professor Kadambot Siddique

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Pingelly workshop gets down to earth

Leading experts in soil science, agronomy, farming systems, economics, biotechnology, and waste to value innovations 'dug in' to a UWA workshop on Principles of Soil Health & Profitable Agriculture in July.

The workshop was held in Pingelly to capture a diverse audience that included the local farming community and neighbours to the nearby UWA Farm Ridgefield.

About 30 farmers, public and industry partners, agriculture consultants, scientists, and research students attended the event.

Organised by Emerita Professor Lynette Abbott and Dr Hira Shaukat, the workshop highlighted the critical intersection of soil health and agricultural profitability by exploring topics such as principles of soil health, understanding soil biology in context of profitable crops, soil health benefits and carbon sequestration, the economics of low-input mixed farming systems, and the role of circular economy in sustainable agriculture.

The event also held open forums for panel discussions, for interactive dialogue between the participants and experts.

This included ideas about what is a healthy soil, how to test the waters for transitions, how to minimise the risk of transition, what does the success look like in early stages of altering practices, what to consider before buying a soil inoculant.

Speakers included Emerita Professor Abbott, Hackett Professor Kadambot Siddique, Professor Nanthi Bolan, Dr Margaret Roper, Bradley Plunkett, Dr Bede Mickan, Dr Sasha Jenkins and Phil Barrett Lennard.

The workshop was funded by Australian Government Department of Agriculture Fisheries and Forestry and UWA under the Soil Science Challenge project 4-H4T24R2, and the DPIRD and UWA collaborative FutureCarbon13 project.

Emerita Professor Lynette Abbott

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A group of workshop attendees outside the Pingelly Recreation & Cultural Centre.

Professor Kadambot Siddique, Dr Ismahane Elouafi, and Associate Director Professor Wallace Cowling pose in front of canola.

Research in bloom for CGIAR EMD visit to UWA Farm

The winter sun came out for The UWA Institute of Agriculture to introduce Consultative Group on International Agricultural Research (CGIAR) Executive Managing Director Dr Ismahane Elouafi to UWA Farm Ridgefield in Pingelly.

After a busy previous day touring the UWA glasshouses and presenting the 30th Hector and Andrew Stewart Lecture (see page 7), it was a welcome change of pace to visit the WA grainbelt countryside.

The Institute Director Hackett Professor Kadambot Siddique, Business Manager Diana Boykett, and Associate Director Professor Wallace Cowling joined Dr Elouafi – during which they were fortunate to see canola fields in bloom, enjoy a local pub



lunch, and receive a personal tour from Farm Manager Dr Tim Watts.

The group visited multiple research sites, including the Methane Emissions Reduction in Livestock (MERiL) project, where they spoke with Dr Suyog Subedi and Angad Singh about their important and collaborative research.



Professor Siddique, Dr Ismahane Elouafi and Tim Watts in a vetch train site at Ridgefield.



Anti-methane solutions receive grant boost

UWA researchers, led by Dr Zoey Durmic, have been successful in the bid for a final stage of the Methane Emissions Reduction in Livestock (MERiL) Program.

The project attracted a total \$3.2 million in Federal Government funding to find feed additives that can reduce methane emissions from livestock and assist in finding tools to combat climate change.

The UWA team is using a natural-based feed additive Agolin® Ruminant that can lead to potential benefits of methane mitigation, sheep health, performance, and welfare.

After success in stage 1 and 2, in this final stage, they will be combining this additive with other natural additives to achieve even greater results than with a single additive.

They will receive \$1.6 million to progress their work, which will run for over two years at UWA Farm Ridgefield.

Successful outcomes of this project will contribute to the development of sustainable practices for extensively grazed livestock across Australia, promoting carbon neutrality in the sheep industry and ensuring market access for environmentally certified products like wool and sheep meat.

Dr Suyog Subedi delivering feed additive to grazing sheep at Ridgefield.

UWA-KAU project takes centre stage

More than 800 students and faculty members filled the Central Auditorium at Kerala Agricultural University (KAU) for an international seminar on 'Higher Education Prospects in Agriculture & Allied Subjects and Climate Smart Agriculture' in late June.

The UWA Institute of Agriculture Director Hackett Professor Kadambot Siddique presented the keynote – which included discussions on the future of agricultural education and the adoption of climate-smart practices, as well as study opportunities at UWA.

Professor Siddique and Winthrop Professor Michael Blakeney travelled to Kerala together to present the results of the UWA-KAU collaborative ARC Discovery project.

UWA Professors Kadambot Siddique and Michael Blakeney pictured with KAU leaders and collaborators.



Professor Blakeney provided a comprehensive overview of the project from the UWA perspective, followed by Professor Jayasree Krishnankutty who offered insights into the project's execution from KAU's standpoint.

The dual objectives of the project were to:

1. Examine the ways that small-holder or marginal farmers identify, conserve and exchange useful plant material and incorporate it into cultivated crops through plant selection and breeding, under ongoing conditions of climate change, and

2. Identify the ways in which the regulatory structures in the countries help or hinder this process.

During their visit to Kerala, professors Siddique and Blakeney interacted with KAU Vice Chancellor Dr B. Ashok, senior executives Dr Gopakumar, Dr Madhu Subramanian, Dr Jacob John, Dr P.O Nameer and deans of various faculties.

Professor Michael Blakeney
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Senior members of UWA, researchers, and executives from Richgro at the glasshouse tour.

“Through this project, we are taking the proactive approach so there is minimal impact to the sector getting ahead of the curve.”

Recently, a UWA glasshouse tour highlighted the latest research achievements to senior members of the University and executives from Richgro.

Attendees included Head of the UWA School of Agriculture and Environment Associate Professor Matthias Leopold, chief investigator Professor Megan Ryan, and Senior Deputy Vice-Chancellor Professor Tim Colmer.

Richgro was represented by Managing Director Tim Richards, Chair Geoff Richards, Commercial Manager Troy Franks, and Chief Financial Officer Alan Graham.

The tour featured vibrant petunias, the most widely sold plant species in the home gardening marketplace, grown in sustainable potting media derived from food waste and various carbon sources from the Perth metropolitan area.

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Unearthing innovative potting mix from waste

In response to the growing shortages of base production materials for the nursery industry, The University of Western Australia is leading an innovative project to develop sustainable potting mix derived from waste resources.

The experiment, by visiting German student Tom Wagner under the supervision of UWA Research Fellow Dr Bede Mickan and assisted by technician Evonne Walker, is part of a broader project funded by the ARC Training Centre for the Transformation of Australia's Biosolids Resource.

Dr Mickan, who is the Research and Development Manager at WA garden product business Richgro, said the project showcased the collaborative efforts between industry and academia to address material shortages and promote sustainability in the nursery industry.

“Pine bark is the main substrate used as potting mix, and production material shortages are due to the fact that less timber mills were planted years ago in favour of cheap imports,” he said.

“WA is growing in population and the nursery industry needs to match demand, and we can only do this with organic waste materials due to a reduction in supply.



Industry Forum debates: Is net zero in agriculture a pipe dream?

Just because it is extremely unlikely that the entire agricultural sector will reach net zero doesn't mean we shouldn't try, declared keynote speaker Dr Michael Crawford at The UWA Institute of Agriculture's 2024 Industry Forum.

"Maybe individual farms or industries can, in some regions or for a period of time, but as a sector, I'm going to say no," CRC for High Performance Soils CEO Dr Crawford said.

"But that doesn't mean we shouldn't try, and that is the most important part that we need to get right.

"There's plenty of reasons why we should be doing this."

The event was opened by the Minister for Energy, Environment, and Climate Action the Hon. Reece Whitby MLA, followed by a passionate Welcome to Country from Curtin University Indigenous Liaison Manager Heidi Mippy.

Following the keynote presentation, UWA Professor of Agricultural Economics and DPIRD Chief Economist Ross Kingwell took to the stage to explain "the challenge is growing".

Professor Kingwell told the audience that emissions may be on the rise, but the composition of these emissions was changing – and the focus on reducing emissions had shifted towards cropping systems.

"If I was to give this talk a decade ago, the emphasis would have been on those belching cows," he said.

In his presentation, President of Pastoralists and Graziers Association Tony Seabrook reminded the audience that the transport sector (e.g. cruise ships and planes) produced huge emissions and tons of garbage, and yet agriculture was being demonised.

The urgent and oft-controversial topic 'Can agriculture reach net zero?' attracted more than 270 people – the largest audience in the Industry Forum's 18-year history – to the University Club of WA main auditorium in July.

The panel and audience Q&A was facilitated by Planfarm agronomy consultant Rob Grima.

It featured lively discussion from Challa Station pastoralist Debbie Dowden, Inter. Earth Business Development Manager Peter Metcalfe, 2023 CBH Nuffield scholar and Mingenew farmer Rebecca Kelly, and farm business advisor Richard Brake.

The Institute's annual Industry Forum is supported by CSBP and Farmers Ltd Jubilee of Agriculture Science Fellowship.

[Watch the event recording](#) on the Institute's YouTube channel.



Rob Grima addresses the crowd while introducing the panellists.

Longtime UWA researcher and mentor named CSSA Fellow

Almost 30 years at CSIRO, more than two decades at UWA, and countless PhD students, research collaborations and national and international conferences have culminated in an “overwhelming” recent honour for The UWA Institute of Agriculture Adjunct Professor Jairo Palta.



In June, Adjunct Professor Palta was elected a Fellow of the Crop Science Society of America (CSSA), which is the highest recognition bestowed by the society to acknowledge significant achievements and meritorious contributions to crop science.

Adjunct Professor Palta received a BA in Plant Biology from Universidad del Valle in Colombia, a Master’s in Plant Physiology from CINVESTAV in Mexico, and his PhD in Crop Physiology and Genetics from Latrobe University in Melbourne.

He is internationally recognised for his contributions to the adaptation of crops to water deficits, waterlogging, salinity, heat, and climate change and their impact on

yield, water- and nitrogen-use efficiency.

With a focus on roots, Adjunct Professor Palta has worked with agronomists and breeders to improve management practices and breeding targets.

He has played a prominent role in the development of new techniques for studying crop root systems in the field and under controlled conditions and pioneered the development of methodologies to study the interaction of elevated CO₂, terminal drought and heat stress on the growth, development, and yield of wheat.

Among his many achievements, Adjunct Professor Palta said the most rewarding part of his time at UWA was mentoring highly

Adjunct Professor Jairo Palta pictured amidst wheat plants in a UWA glasshouse.

motivated PhD students who hailed from many different countries around the world.

“I feel happy and overwhelmed that a society like CSSA has elected me as a Fellow,” he said.

“It is significant both personally and professionally that my contribution to crop science as a researcher and supervisor of graduate students and young postdoctoral fellows is recognised.”

Adjunct Professor Jairo Palta
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Time was ripe for SiME’24 seminar

A two-day international program on ‘Navigating Shared Futures in Social Innovations, Management, Economics and Engineering’ (SiME’24) at UWA resulted in more than 100 research papers and 60 attendees in late May.

Last year, the UWA Centre for Agricultural Economics and Development (CAED) signed a Memorandum of Understanding with Universiti Teknologi Mara (UiTM) in Malaysia to develop research collaboration and academic and cultural interactions.

Under this MOU, Associate Professor Fay Rola-Rubzen invited UiTM researchers to Australia to meet our staff and discuss potential research collaborations with CAED members and, more broadly, with other UWA researchers.

UWA PhD candidates Oanh Nguyen, Putri Setyowati, Jon Sarmiento, and Ruixue Wang presented papers at the international seminar – with Ms Setyowati receiving the Best Presenter Award.

Dr Alaya Spencer-Cotton chaired one of the sessions, focused on climate change and agriculture.

The second day was the UiTM-UWA Industry-Academic & Community Engagement workshop, focussed on future collaborations between UiTM and UWA research staff.

The main purpose was to introduce UiTM staff to our university, discuss some of our research activities, and find ways to collaborate through staff or student exchanges, joint research activities or student research project co-supervision.



Associate Professor Kay Dora Abd Ghani presents Professor Marit Kragt with a gift at the launch ceremony.



CGIAR leader makes the most of special UWA visit

Xiaowen Fan explains her research into the carbon budget of chickpea germplasms to Dr Ismahane Elouafi.

A jam-packed program during a whirlwind three-day visit kicked off with a glasshouse tour for Executive Managing Director of the Consultative Group on International Agricultural Research (CGIAR) Dr Ismahane Elouafi.

The UWA Institute of Agriculture exclusively brought Dr Elouafi to WA to deliver the 30th Hector and Andrew Stewart Memorial Lecture on 8 August.

The morning of the lecture, the Institute Director Hackett Professor Kadambot Siddique led a UWA glasshouse tour, during which Dr Elouafi interacted with six research students with active experiments.

PhD candidate Huyen Pham's experiment demonstrated wheat rhizosheath development in 1.5m rhizoboxes packed with acidic soil from the Merredin wheatbelt region.

This year marked the 30th Hector and Andrew Stewart Memorial Lecture. The inaugural event was held in 1966. The lecture is held in honour of the late Hon Hector J Stewart, MLC and his son, the late Andrew M Stewart.

Later that evening, a crowd of more than 120 people gathered at the UWA Wilsmore Lecture Theatre to watch Dr Elouafi deliver her lecture, titled 'Science & Innovation to Transform Global Food Systems, in a Climate Crisis'.

Dr Elouafi explored the urgent need to transform global agriculture and food systems to adapt and mitigate climate change and provided an overview of CGIAR.

"I strongly believe working and partnering together is the most important factor," she said.

"We must make sure we connect the dots, so that agriculture, biodiversity, climate change, nutrition are prioritised and donors like ACIAR and the Australian Government put more funding into basic, applied and developmental research."

[Watch the lecture recording on the Institute's YouTube channel.](#)



Dr Elouafi presenting the 30th Hector and Andrew Memorial Lecture.

"The experience was immensely valuable, providing an opportunity to align my work with CGIAR's goals," Ms Pham said.

"My country has also benefited greatly from CGIAR's research support, and I am passionate about contributing to Vietnam's agricultural development in the future."

Fellow postgraduate students Xiaowen Fan, Shuyan Li, Jelena Um, Chuangwei Fang, and Huaikang Jing also presented on their projects.

"Interacting with Dr Elouafi was a valuable experience for me, and her insights helped me reflect on the broader implications of my work," Mr Jing said.

Stewart family and special guests sit in the front row.





Postgraduate Showcase student presenters with their mentor Emeritus Professor Graeme Martin (far left) and Hackett Professor Kadambot Siddique.

Sold-out crowd gathers for 18th annual Postgraduate Showcase

In our modern society – even with all our technological advancements – food and water security remain fundamental to life and at the heart of our political, economic, and cultural practices.

This sentiment was emphasised by Head of the UWA School of Social Sciences Professor Amanda Davies during her opening address to an audience of almost 100 people at The UWA Institute of Agriculture’s 2024 Postgraduate Showcase in May.

“The purpose that we’re gathered here is to emphasise the critical role that graduate research plays in shaping the future of our food security, driving innovation in industry and sustaining livelihoods,” Professor Davies said.

“Through these seven speakers today, you will hear the collective effort of 21 years of research in agriculture and related areas.”

“Graduate research is special because it’s intensive and can utilise new methods and access new ideas that is difficult in other settings. The importance of intensive research cannot be overstated.”

The Institute Director Hackett Professor Kadambot Siddique reflected that “time

flies” given that this year marked the 18th annual Postgraduate Showcase.

The first session was chaired by Co-Director of the UWA Centre for Environmental Economics and Policy Dr Abbie Rogers.

Now in the final year of her research, Sneha Priya Pappula Reddy from the UWA School of Agriculture and Environment (SAGe) presented on ‘Unravelling the physiological and molecular basis of drought tolerance of chickpea’.

The next presenter was Dr Michael Young, who completed his postgraduate studies in late 2023 to develop a new approach to farm optimisation modelling enhances strategic and tactical livestock management in WA mixed farm businesses.

Fellow SAGe PhD candidate Jessie Weller then explored her geophysical characterisation of a lateritic hillslope in the Avon River Critical Zone Observatory, which is based at UWA Farm Ridgefield.

The final speaker before the afternoon tea break was Samantha Harvie from the School of Molecular Sciences, whose research is centred on understanding how the timing of nitrogen application affects wheat protein composition.

Head of the School of Biological Science Professor Patrick Finnegan took over chairing responsibilities for the second and final session.

SAGe candidate Sarah Babington guided the audience us through her thesis topic ‘Identifying and validating novel biomarkers of sheep welfare’, followed by Sharmin Sultana from the UWA School of Allied Health who explored the identification and quantification of isoflavones in monofloral clover honeys.

The final speaker of the day was Felipe Castro Urrea from SAGe, whose talk was titled ‘Sustainable and rapid genetic gain with genomic selection in early generations of a field pea breeding program’.

[Watch the event recording on the Institute’s YouTube channel.](#)

Jessie Weller presenting at the packed Bayliss Lecture Theatre.



Future Regions Lab Director
Associate Professor Kirsten Martinus.

Future Regions Lab primed for collaboration

Childhood experiences of regional towns and agriculture, and the strong desire to help the people and industries there, have shaped Associate Professor Kirsten Martinus' research agenda.

"I grew up in the bush in the hills near Dwellingup, where my parents ran a hobby farm," Associate Professor Martinus shared.

"We lived far from the town – it took two hours to get to school one way, so a four-hour commute each day."

Given her background, it is no coincidence that Associate Professor Martinus now leads the [Future Regions Lab](#) at UWA, which is focused on regional development (particularly for the Australian context) and seeks to understand and address inequality within and between regions.

The Lab emerged to better understand the challenges and characteristics of regions under increasing globalisation, market restructuring, growing socio-economic inequalities, population pressures and ecological crises.

Its evidence-based research works to better inform strategic decision-making and policy formation across a wide range of industry and socio-economic topics, including global supply chains, labour productivity, industry transitions to net zero, technology adoption and innovation, regional decline, and community inequality and disadvantage.

Associate Professor Martinus said there were many opportunities for collaboration with The UWA Institute of Agriculture.

"We have recently completed a project into agritourism, which included a study of all agritourism providers in the southwest of WA (excluding wineries)," she said.



"Agritourism has become a critical way that agricultural regions connect communities, it provides farmers with additional incomes increases awareness of regions and regional lifestyles as well as connects those living in metropolitan areas to farming and the environment."

"This project also included a study into the rise of hobbyist beekeepers in WA to understand how they support commercial industry."

The Lab has worked on international projects, such as partnering with an Indonesian university in South Sulawesi to examine the socioeconomic impact of major rail infrastructure on agricultural communities.

More recently, they collaborated with colleagues in Japan to examine the transformation of agricultural practice and regional communities to stop or decrease the decline of rural areas and the farming sector.

In coming years, Associate Professor Martinus said she hoped to expand their research networks in the net zero agriculture space, and in improving the efficiency in how the Australian agricultural industry engages with global supply chains.

"It would also be great to collaborate with UWA Farm Ridgefield through the Best Practice Farming Systems Project," she said.

"Our work would fit into how the farm relates to the wider community, and also possibly trialling novel ways to improve how produce is sold in global markets."

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ICAR-IARI staff and students following one of Professor Kadambot Siddique's guest lectures.

Director delivers on productive New Delhi visit

The exciting potential of a joint PhD program between UWA and Indian Council of Agricultural Research (ICAR)-Indian Agricultural Research Institute (IARI) is another step closer thanks to a recent visit by The UWA Institute of Agriculture's Director.

As part of his commitment to ICAR-IARI as an Adjunct Professor, Hackett Professor Kadambot Siddique delivered several lectures to the Division of Plant Physiology postgraduate students and staff.

Professor Siddique also met with Professor Ashok Kumar Singh, former ICAR-IARI Director and Vice Chancellor Dr Renu



Pandre, Dr Madan Pal, Dr Chellapilla Bharadwaj, Dr Ruchi Bansal, Dr Anupama Singh, Dr K Vinod and fellow leaders.

"We discussed ongoing collaboration between IARI and the Institute and UWA, particularly a joint PhD program," he said.

During his visit to New Delhi, Professor Siddique found time to meet with the High Commissioner of Australia to India, His Excellency Philip Green.

They were joined by Counsellor (Agriculture) Kiran Karamil and Second Secretary of Trade and Economics Tom Overton-Clarke.

"We discussed various aspects of engagement between Australia and India on higher education, agricultural research and development, and trade negotiations," Professor Siddique said.

"I briefed them on UWA's excellent track record in partnering with Indian universities and research institutions."

Joint seminar serves up Food for Thought

Social licence, ethical animal production and the recent impacts of international trade on Australian producers were the timely topics under examination at a special seminar co-hosted by The UWA Institute of Agriculture and UWA School of Agriculture and Environment (SAGe) in April.

In her opening presentation, SAGe lecturer Dr Kelsey Pool noted that the ensuing discussion was very topical and trending in mainstream media.

"The inspiration behind this seminar series was stimulated from events that happened in January 2024," Dr Pool said.

"We saw a live export ship carrying sheep headed from Australia to the Middle East stopped in its tracks and turned back to Australian shores."

"This meant those animals spent a few extra weeks at sea, spurring a national debate around animal welfare, Australia's international trade and generally just highlighted that we've got a massive gap of knowledge and public transparency around production systems and trade."

The seminar kicked off with a talk from Curtin University Associate Professor of Supply Chain Management & Logistics Liz Jackson.

The Institute's Sustainable Animal Production theme leaders Associate Professor Dominique Blache and Professor Shane Maloney then presented,



Associate Professor Liz Jackson, Professor Shane Maloney, Marion Lewis, Associate Professor Dominique Blache and Dr Kelsey Pool.

followed by The Livestock Collective project coordinator Marion Lewis.

Following short presentations exploring the live export trade, livestock welfare, thermal physiology and novel methods of animal monitoring – the seminar culminated in a panel discussion and audience Q&A.

[Watch the lecture recording](#) on the Institute's YouTube channel.

The final review took place in May at the Kenya Agricultural and Livestock Research Organization.

Rapid breeding for improved common bean in Africa on brink of breakthrough

The final review of their project to develop biofortified rapid-cooking beans in Africa has brought UWA researchers and collaborators within arm’s reach of a “substantial breakthrough for human health and welfare”.

Funded by Australian Centre for International Agricultural Research (ACIAR) and led by UWA and the Pan Africa Bean Research Alliance (PABRA), this ground-breaking \$2.48 million project has reduced beans’ cooking time by 24 per cent and increased iron and zinc content by 12 to 14 per cent and five to six per cent, respectively, in improved common bean (*Phaseolus vulgaris*) populations.

Once grown by farmers, rapid-cooking and nutrient-rich varieties will alleviate the burden on women and children who no longer need to expend excessive time, fuel, and resources preparing beans.

The collaboration between researchers, farmers, policymakers, the private sector and other stakeholders has been instrumental in the projects’ success.

A world-leading approach to plant breeding called BRIO, developed by The UWA Institute of Agriculture Associate Director Professor Wallace Cowling, has been applied by African researchers to accelerate population improvement and, ultimately, release improved varieties.

The final review will assess the project’s effectiveness, sustainability, and scalability, providing valuable insights for future agricultural development initiatives.



“The project has taught African plant breeders that, if they learn new approaches to plant breeding, they can increasingly solve complex problems,” Professor Cowling said.

“UWA Research Associate Dr Renu Saradadevi and I have been training African breeders in new BRIO methods, while developing BRIO for African common bean breeding programs.”

“We are trying our hardest to help our African colleagues achieve their goals of releasing a biofortified rapid cooking bean variety – this will improve the health and welfare of African women and children who currently suffer from iron and zinc deficiency and protein deficiency.”

The Institute Director Hackett Professor Kadambot Siddique said UWA was proud of its ongoing collaboration with ACIAR on various research and development projects worldwide over the decades.

“This highly collaborative project is a powerful vehicle to transfer superior bean varieties and capacity building to six African countries,” Professor Siddique said.

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Project leader Professor Cowling examining beans during the annual review event.





Professor Jim Kinsella presenting at Bayliss Lecture Theatre.

Lecture reinforces importance of agricultural extension

While touring UWA Farm Ridgefield, University College Dublin Professor Jim Kinsella was struck by the stark contrast in scale between Australian and Irish farming systems.

"Ireland has about 135,000 farms that are practically all family-owned and an average size of 33.4 hectares," Professor Kinsella explained.

"That Ridgefield is considered a relatively modest farm of 1600 hectares, well, what can I say except Ireland has more small intensive farming."

Despite this contrast, Professor Kinsella argued that there was plenty more that Western Australia and Dublin had in common – especially their universities' desire to strengthen agricultural extension service through postgraduate studies.

The UWA Institute of Agriculture and the UWA School of Agriculture and Environment co-hosted a special lecture delivered by Professor Kinsella during his month-long visit in May.

In his lecture, he explored how agricultural extension services had been largely neglected in teaching and research programs globally in the 1990s and 2000s.

"Today, agriculture graduates play a key role in supporting farm decisions through public and private extension services," he said.

"Postgraduate agricultural extension programs delivered through universities such as University College Dublin equip them with the knowledge and capabilities to play such roles."

[Watch the lecture recording](#) on the Institute's YouTube channel.

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Valuable China visit strengthens connections

Seventeen years since UWA and Lanzhou University established an agreement of research collaboration and student exchange, a recent visit by The UWA Institute of Agriculture adjunct professors Neil Turner and Jairo Palta has ensured this connection is stronger than ever.

In April, the pair spent two weeks in Lanzhou, China working with PhD students and early-career research scientists to assist them with data interpretation and publication of their research.

The visit was funded by a 1.1.1 Project of the Chinese Ministry of Education to Lanzhou University.

A group of attendees to the First Crop Evolutionary Symposium visit the Loess Plateau.



It was the latest of many visits in the past near two decades, which has seen several short-term exchanges of staff and many PhD students and postdoctoral researchers spend periods of six to 18 months studying and working at UWA.

In addition to leading several sessions with students outlining the requirements for publication in high-impact journals, both adjunct professors spoke at the First Symposium on Crop Evolutionary Ecology.

The conference included a visit to several research stations on the Loess Plateau

to observe current Lanzhou University research to improve crop yields in the cold, short-season environment.

Adjunct Professor Turner then toured the North-West Agricultural and Forestry University in Yangling, where he has been working with students in the College of Natural Resources and Environment.

He also travelled to Guizhou University to visit soybean breeder Associate Professor Jin He, who spent 2023 at UWA working with Emeritus Professor Hans Lambers.

UWA student Xiaojie Hu among her canola plants at the Shenton Park Field Station.

PhD candidate keeps her cool during canola heat tolerance experiments



If you think you're skilled at multitasking, just try single-handedly caring for more than 500 canola plants at once – each needing to be treated at a specific stage of flowering – in the UWA Shenton Park Field Station screenhouse.

This unenviable challenge was recently accomplished by UWA PhD candidate Xiaojie Hu, who is working under the supervision of Professor Wallace Cowling, Dr Sheng Chen, and Hackett Professor Kadambot Siddique.

Her research is co-funded by the Grains Research & Development Corporation (GRDC) through the project 'Improving canola heat tolerance - a coordinated multidisciplinary approach' and supported by the China Scholarship Council and the UWA International Fee Scholarship.

"The most rewarding aspect of this research experience so far has been the opportunity to enhance my problem-solving skills," Ms Hu said.

"I was tasked with 20 different genotypes and four sampling timepoints while managing those 500 plants, so I used different coloured pens to mark the plants for each day's sampling."

"This system has helped me efficiently identify and manage the plants throughout the experiment."

The ongoing screenhouse experiment at Shenton Park Field station (which includes two temperature-controlled rooms to carry out the treatments) is the third experiment of Ms Hu's postgraduate research.

It aims to identify gene expression patterns under heat stress and discover potential heat-response genes through transcriptomic analysis.

Ms Hu said her research sought to deepen the understanding of how canola plants respond to heat stress and identify key genes or pathways involved in this response.

"Climate change, particularly global warming, poses a significant challenge to agriculture," she said.

"As a cool-season crop, canola is especially vulnerable to heat stress, which is a major factor limiting its yield.

"Our findings will be crucial for future breeding efforts aimed at developing heat-tolerant and climate ready canola cultivars."

Dr Chen, who leads the GRDC project, said Ms Hu was intelligent, diligent and productive.

"Her PhD research work in RNAseq and proteomics helps the identification of the heat tolerance genes, which is an important part of our GRDC-funded canola heat tolerance project," he said.

Xiaojie Hu

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Eyes in the sky: Lecture explores EOS potential

Having just graduated from Oxford University in 1965, Richard Smith could not believe his luck when he landed a job as a farm management consultant to 35 farmers, managing over a million acres, halfway across the world in Western Australia.

This dramatic sea change soon led to Dr Smith discovering his life's work and passion: utilising satellite remote sensing to reveal the dynamic changes happening in surrounding oceans and agricultural and rangeland landscapes.

He shared his unique perspectives and career reflections at a special lecture hosted by The UWA Institute of Agriculture in June.

In his lecture, Dr Smith covered many topics from his book, co-authored by Henry Houghton and published in 2020, which told of introducing the new technology of Earth Observations from Space (EOS) into the WA Government.

These EOS satellites broadcast free to ground repeated multi-spectral images of Earth from space, giving a new and unique view of the Earth, and revealing the dynamic changes happening in surrounding oceans and in agricultural and rangeland landscapes.

Dr Smith said EOS initially proved of great value for geologic mapping in identifying areas of prospectivity for mining.

"Later, many innovative applications of EOS were developed for management of the renewable resources of agriculture, fisheries, rangelands and tourism," he said.



Dr Richard Smith presenting at Bayliss Lecture Theatre.

Dr Smith shared examples of these developments and the possibilities that exist for driving beyond net zero to negative emissions, along with the political obstacles to the applications of EOS.

[Watch the lecture recording](#) on the Institute's YouTube channel.

Dr Richard Smith
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Bioinformatics and statistical training attract HDR students

Workshops on bioinformatics and statistics were well attended by UWA School of Agriculture and Environment for Higher Degree Research (HDR) students in May and July.

Research associates Dr Pankaj Singh and Dr Yunyun (Allie) Zheng conducted the workshops, with funding from the Soil Science Challenge project supported by Department of Agriculture, Fisheries and Forestry (H4T24R2).

The first workshop 'Introductory workshop on data analysis and visualisation with R' introduced students to the world of statistical analysis and visualisation using R programming language.

Following positive feedback and numerous requests from students, another workshop 'Introductory workshop

on bioinformatics and microbiome data analysis' was organised.

This workshop emphasised the basics of bioinformatics and amplicon sequencing data analysis using different bioinformatics tools.

More than 30 HDR students from various disciplines attended the workshops, which

involved lectures, tutorials and real time data analysis.

They were presented in a highly interactive way in which instructors troubleshooted programming issues on laptops and addressed numerous questions from students on site.

A group of students at the workshop on data analysis and visualisation with R.



Vale Dr John Gladstones

AO AM FTSE FAIA

1932 - 2024

By Professor Wallace Cowling

Associate Director,
The UWA Institute of Agriculture

Dr John Gladstones was likely the most revered agricultural scientist of the 20th century in Western Australia, receiving accolades from WA farmers and the wine industry.

From UWA's perspective, John was one of the most highly talented, resourceful and impactful faculty members of The UWA Institute of Agriculture (the Institute) in its formative years.

John was a brilliant undergraduate student 1950-53 in agricultural science at UWA and was strongly encouraged to focus his research on lupins in his Honours year (1954) and PhD (1955-58) at UWA by his mentor and supervisor Professor Andrew Stewart, Deputy Director of the Institute.

This was fortuitous for WA farmers, as John went on to fully domesticate and breed narrow-leaved lupins and release subterranean clover varieties while at university, and he also found time to pursue his hobby of climatology and viticulture through which he identified prime wine-grape growing regions in WA.

Professor Underwood recognised John's potential and offered him the position of lecturer in agronomy at the Institute in 1959.

John revelled in what he calls the "golden years" of research at the Institute from 1959 until 1970, during which he fully domesticated narrow-leaved lupins and released several varieties.



Dr John Gladstones (centre) in a field of lupins that he bred, with lupin grower Viv Carson (left) and WA Department of Agriculture agronomist Peter Nelson (right), in 2004.

He also bred and released low-oestrogen subterranean clover varieties.

John endured criticism for taking stands that were not deemed to be politically acceptable at times, but nearly always he could take credit for being right in the end.

John set very high standards of intellectual rigor to his science, based on facts, information, understanding and wisdom, which he wisely summarised in his Occasional Address to students at a UWA graduation ceremony in 1988 where he was awarded the Doctor of Science in Agriculture.

He is one of only 10 such recipients at UWA and is among eminent names such as Professor Underwood.

John was awarded Member (AM, 1986) and Officer (AO, 2022) in the General Division of the Order of Australia for his work in primary industry, particularly agriculture and viticulture, and as an author.

John was a devoted son, brother, husband, father and grandfather.

His wife Pat Gladstones, who sadly passed away in 2019, was a talented musician and music teacher in WA.

Together they raised two children; daughter Helen Gladstones is recipient of the Public Service Medal (2023) and editor and publisher of John's 2018 memoirs, and son Robert is Principal 3rd Horn in WA Symphony Orchestra and performs regularly as French horn soloist, music teacher, and music director in WA.

John's memoirs are extremely interesting, humorous, and surprising – a complete picture of a rewarding and valuable life.

[Read the unabridged version of this article online.](#)



Potential of GABA much to gab about

While Gamma-Aminobutyric Acid (GABA) is a chemical neurotransmitter commonly known in the medical field, Dr Iqbal Khan convinced attendees at a May lecture hosted by The UWA Institute of Agriculture that it has an important role in plants.

In his introduction, the Institute Director Hackett Professor Kadambot Siddique recalled first meeting Dr Khan in 2015 at the International Plant Physiology Congress in New Delhi.

“Since then, our friendship has continued and he became an Adjunct Associate

Professor with us last year,” Professor Siddique said.

“Although I am his mentor, I have also learned a lot from him, particular his research into reducing stress impact through physiological markers.

“He has essentially targeted the staple crops, including wheat and rice, which is where a lot of the funding comes from in India to reduce their environmental stress susceptibility under the anticipated climatic pressures in the future.”

Dr Iqbal Khan is an Assistant Professor in the Botany Department, and Deputy Director of the Centre for Environment and Sustainable Development at Jamia Hamdard in India.

Professor Kadambot Siddique and Dr Iqbal Khan (middle) with some attendees following the lecture.

During his lecture, he focused on his work to understand GABA-mediated source-sink metabolism, defence networks, and growth and agronomic outputs under salt stress in wheat plants.

While at UWA, Dr Khan met with several researchers and Deputy Vice Chancellor Research Professor Anna Nowak to discuss potential areas of future collaboration.

[Watch the lecture recording](#) on the Institute’s YouTube channel.

Dr Iqbal Khan
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Awards and industry recognition

Name	Award
Professor Jacqueline Batley	Finalist for WA Scientist of the Year – 2024 Premier’s Science Awards
Adjunct Professor Jairo Palta	Fellow of the Crop Science Society of America
Dr Kelsey Pool	Finalist for 2024 WA Young Tall Poppy Award
Golam Azam	John Cripps Horticulture Scholarship
Adjunct Professor Susana Neto	International Eminent Scientist Award – World Congress 2023 (Water, Agriculture and Climate), India
Darcy Lefroy	Postgraduate scholarship – WA Agricultural Research Collaboration
Chloe Rout	Postgraduate scholarship – WA Agricultural Research Collaboration
Montana Walsh Baddeley	Postgraduate scholarship – WA Agricultural Research Collaboration
Roberto Lujan Rocha	Postgraduate scholarship – WA Agricultural Research Collaboration
Yusi Zhang	Postgraduate scholarship – WA Agricultural Research Collaboration
Mahnaz Afsar	Postgraduate scholarship – WA Agricultural Research Collaboration

Name	Award
Saira Azmat	Postgraduate scholarship – WA Agricultural Research Collaboration
Huyen Pham	Postgraduate scholarship – WA Agricultural Research Collaboration
Angelia Tanu	Postgraduate scholarship – WA Agricultural Research Collaboration

Visitors to IOA

Name of visitor	Visitor's organisation and country	Host details	Dates of visit
Professor Liz Jackson	Curtin University, WA, Australia	The UWA Institute of Agriculture & UWA School of Agriculture and Environment	April 2024
Marion Lewis	The Livestock Collective, Australia	The UWA Institute of Agriculture & UWA School of Agriculture and Environment	April 2024
Professor Jim Kinsella	University College Dublin, Ireland	The UWA Institute of Agriculture & UWA School of Agriculture and Environment	May 2024
Dr Iqbal Khan	Jamia Hamdard, India	The UWA Institute of Agriculture	May 2024
Dr Tony Irawan	Institut Pertanian Bogor (IPB), Indonesia	Associate Professor Fay Rola-Rubzen	May 2024
Professor Lukytawati Anggraeni	IPB, Indonesia	Associate Professor Fay Rola-Rubzen	May 2024
Mukhamad Najib	Education and Culture Attaché, Indonesian Embassy	Associate Professor Fay Rola-Rubzen	May 2024
Professor Yusman Syaukat & Professor Hermanto Siregar	IPB, Indonesia	Associate Professor Fay Rola-Rubzen	May 2024
Professor Madya Dr Kay Dora Abd Ghani	Universiti Teknologi Mara (UiTM), Malaysia	Associate Professor Fay Rola-Rubzen	May 2024
Professor Madya & Dr Wan Liza Md Amin	UiTM, Malaysia	Associate Professor Fay Rola-Rubzen	May 2024
Dr Tay Chia Chay	UiTM, Malaysia	Associate Professor Fay Rola-Rubzen	May 2024
Dr Mohd Ikmal Fazlan Rozli	UiTM, Malaysia	Associate Professor Fay Rola-Rubzen	May 2024
Dr Richard Smith	Perth, Australia	The UWA Institute of Agriculture	June 2024
Mathis Calvel	Purpan Ecole D'Ingenieurs, France	The UWA Institute of Agriculture	June – September 2024
Dr Michael Crawford	CRC for High Performance Soils, Australia	The UWA Institute of Agriculture	July 2024
The Hon. Reece Whitby MLA	WA Minister for Energy, Environment, and Climate Action, Australia	The UWA Institute of Agriculture	July 2024
Heidi Mippy	Curtin University, WA, Australia	The UWA Institute of Agriculture	July 2024
Tony Seabrook	Pastoralists and Graziers Association, WA, Australia	The UWA Institute of Agriculture	July 2024
Rob Grima	Planfarm, WA, Australia	The UWA Institute of Agriculture	July 2024
Debbie Dowden	Challa Station, WA, Australia	The UWA Institute of Agriculture	July 2024
Peter Metcalfe	Inter Earth, WA, Australia	The UWA Institute of Agriculture	July 2024
Rebecca Kelly	Mingenew, WA, Australia	The UWA Institute of Agriculture	July 2024
Richard Brake	Richard Brake Consulting, WA, Australia	The UWA Institute of Agriculture	July 2024
Dr Ismahane Elouafi	CGIAR, France	The UWA Institute of Agriculture	August 2024
Dr Jun Zou	Huazhong Agricultural University, China	The UWA Institute of Agriculture & GRDC	August – September 2024

New postgraduate research students (PhD)

Student	Topic	School	Supervisor(s)	Funding body
Saira Azmat	Effect of phosphorus availability and root morphological traits on adaptive responses to salinity stress in barley (<i>Hordeum vulgare</i>)	UWA School of Agriculture and Environment	Associate Professor Yinglong Chen, Associate Professor Sergey Shabala, Dr Zakaria Solaiman	HDR Scholarship & Scholarship for International Research Fees
Mahnaz Afsar	Developing demand-driven extension strategies to improve adoption of precision agriculture technologies in South-West Western Australia	UWA School of Agriculture and Environment	Professor Marit Kragt, Professor Steven Schilizzi, Dr Joanne Wisdom	ARC TC for Behavioural Insights for Technology Adoption & Scholarship for International Research Fees
Eshrat Mahfuza	Interlinkage between market demand for improved agricultural products and adoption of modern farming technologies in climate-prone developing economies	UWA School of Agriculture and Environment	Associate Professor Fay Rola-Rubzen, Associate Professor Amin Mugeru, Associate Professor Atakelty Hailu	Research Training Program Stipend - International Student & UWA International Fee Scholarship

Research Grant

Title	Funding period	Funding body	Investigators
Stage 3.2 – Methane Emissions Reduction in Livestock (MERiL)	2024-2027	Federal Government	Dr Zoey Durmic, Dr Stephanie Payne, Dr Suyog Subedi, Dr Joy Vadhanabhuti, Angad Singh, Sam Lloyd, Hatem Al-Khazraji, Jamie King, Montana Walsh Baddeley, Janet Kok, Nathan Phillips

UWA IOA 2024 Publications

Peer Reviewed Journals

Previously unreported

Martin GB (2024). Perspective: Science and the future of livestock industries. *Frontiers in Veterinary Science* **11** 1359247. doi: 10.3389/fvets.2024.1359247

Rosales-Nieto CA, Thompson AN, Cuevas-Reyes V, Hernández-Arteaga LES, Greeff JC, Veiga-Lopez A, and Martin GB (2024). Utilising male stimulus to improve the reproductive efficiency of 8-month-old nulliparous ewes and adult parous ewes. *Theriogenology* doi: 10.1016/j.theriogenology.2024.01

April to August 2024

Abbasi AA, Saha S, Begum IA, Rola-Rubzen MF, McKenzie AM, and Alam MJ (2024). Does rural transformation affect rural income inequality? Insights from cross-district panel data analysis in Bangladesh. *Heliyon* **10** 1-16 doi: 10.1016/j.heliyon.2024.e30562

Adhikari SP, Timsina KP, Rola-Rubzen MF, Timsina J, Brown PB, Ghimire YN, and Thapa Magar DB (2024). Determinants of conservation agriculture-based sustainable intensification technology adoption in smallholder farming systems: Empirical evidence from Nepal. *Journal of Agriculture and Environment for International Development (JAEID)* **118** (1) 31-50

Amadou I, Houben D, Lambers H, and Faucon MP (2024). Key role of root trait combinations and plasticity in response to

phosphorus forms on phosphorus-acquisition in agroecosystems. *Plant & Soil* doi: 10.1007/s11104-024-06848-8

Barrett-Lennard EG, George N, D'Antuono M, Holmes KW, and Ward PR (2024). Rain and potential evapotranspiration are the main drivers of yield for wheat and barley in southern Australia: Insights from 12 years of National Variety Trials. *Crop & Pasture Science* **75** doi: 10.1071/CP23320

Barrow, NJ (2024). Phosphate solubilizing microorganisms; the modern philosopher's stone. *Plant & Soil* doi: 10.1007/s11104-024-06785-

Chen X, Zhao Y, Cheng J, Hu Y, Si B, Li M, Siddique KHM, Azad N, and He H (2024). Extended HYDRUS-1D freezing module emphasizes thermal conductivity schemes for simulation of soil hydrothermal dynamics. *Geoderma* **448** 116946 doi: 10.1016/j.geoderma.2024.116946

Cohen S, Foss E, Beths T, Musk GC (2024). An Exploration of Analgesia Options for Australian Sheep. *Animals* **14** 990 doi: 10.3390/ani14070990

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de Oliveira HP, de Melo RO, Cavalcante VS, Monteiro TSA, Freitas LG, Lambers H, and Valadares SV (2024). Phosphate fertilizers coated with phosphate-solubilising *Trichoderma harzianum* increase phosphorus uptake and growth of *Zea mays*. *Plant and Soil* doi: 10.1007/s11104-024-06818-0

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Ding W, Jiao W, Pang J, Cong WF, Zheng B, and Lambers H. (2024). Clusters of cultivated soybean landraces from the North China Plain coordinate root morphology and rhizosheath carboxylates enhancing phosphorus acquisition. *Plant and Soil* doi: 10.1007/s11104-024-06717-4

Du X, Zhou L, Li Y, Zhang F, Wang L, Yao J, Chen X, Liu S, and Cao Y (2024). Effects of yak rumen anaerobic fungus *Orpinomyces* sp. YF3 fermented on in vitro wheat straw fermentation and microbial communities in dairy goat rumen fluid, with and without fungal flora. *Journal of Animal Physiology & Animal Nutrition* doi: 10.1111/jpn.13978

Fan X, Matsumoto H, Xu H, Fang H, Pan Q, Lv T, Zhan C, Feng X, Liu X, Su D, Fan M, Ma Z, Berg G, Li S, Cernava T, and Wang M (2024). *Aspergillus cvjetkovicii* protects against phytopathogens through interspecies chemical signalling in the phyllosphere. *Nature Microbiology* **216** doi: 10.1038/s41564-024-01781-z

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- Farooq M, Wahid A, Zahra N, Hafeez MB, and Siddique KHM (2024). Recent advances in plant drought tolerance. *Journal of Plant Growth Regulation* doi: 10.1007/s00344-024-11351-6
- Guilbeault-Mayers X, Lambers H, and Laliberté E (2024). Coordination among leaf and fine-root traits along a strong natural soil fertility gradient. *Plant & Soil* doi: 10.1007/s11104-024-06740-5
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