The UWA Institute of Agriculture

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L-R: Prof Kadambot Siddique, Mr Paul O'Meehan, Mr Robert Davidson, Mr Robert Egerton-Warburton, Mr Richard Norton, Mr Shane Sander and Prof Kent Anderson

Where are we heading with the red meat industry?

IOA's annual Industry Forum, held at the UWA University Club in July 2015 posed the question 'Where are we heading with the red meat industry?'

The much anticipated event, now in its ninth consecutive year focussed particularly on the sheep and cattle industries, and what Australia needs to do to maintain its competitive export market.

IOA Director Hackett Professor Kadambot Siddique said the Industry Forum had become a highlight of the agricultural calendar because the event focused on advancing Australia's agriculture sector.

"The coming generation of farmers needs to be both innovative and competitive in the global market," Prof Siddique said. "We need to ensure they have the tools, technologies and new farming systems to do so.

"In consultation with our Industry Advisory Board, we decided the discussion at this year's Industry Forum would be around the current status, issues and future directions of the red meat industry, in particular cattle and sheep."

Professor Kent Anderson, UWA Deputy Vice-Chancellor (Community and Engagement) opened the event and welcomed the packed auditorium of key opinion leaders, the agribusiness industry, farmers, researchers, and students.

Flying in from New South Wales to deliver the Opening Address was Meat and Livestock Australia's (MLA) Managing Director Mr Richard Norton. Mr Norton discussed how MLA is building demand for red meat through data-driven marketing strategies that predominantly targets Australian families and international markets. MLA's 'You're Better on Beef' campaign has a strong nutritional message that reinforces to consumers what they love about beef.

WAMMCO's Supply Development Manager, Mr Robert Davidson presented a regional perspective and gave an overview of what WAMMCO is doing to maintain and grow its export markets. He said the overall outlook remains positive for those involved in the lamb industry with continuing demand from the core markets, USA, Middle East and China. "Above all, lamb needs to meet and surpass customer expectations whilst remaining affordable," Mr Davidson said.

The next speakers were cattle and sheep farmers Mr Paul O'Meehan

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DIRECTOR'S COLUMN

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The August issue of The UWA Institute of Agriculture (IOA) newsletter is something I look forward to. It highlights the great progress that our researchers from UWA and internationally have achieved in the first half of the year.

In May, UWA launched an Africa Research Cluster (**arts.uwa.edu.au/research/clusters/Africa_Research**) to boost Australia's relationship with Africa. The interdisciplinary research group brings together UWA expertise on a range of issues relevant to Africa, including climate change, development, natural resources and agriculture. As such, we have chosen to highlight some of our activities, new students and, and research and training collaborations with Africa in agriculture and related areas (see pages 8, 10,17 and 18).

The annual Postgraduate Showcase was held in June and we were pleased to have Vice-Chancellor Professor Paul Johnson give the opening address (see page 6). Prof Johnson reinforced the important contribution that postgraduate students make to the research outputs of the university. Congratulations to all the students who presented.

Last month we hosted another successful Industry Forum entitled, *Where are we heading with the red meat industry?* I would like to acknowledge IOA's Industry Advisory Board for choosing the topic. In particular to Mr Shane Sander for support in the planning phase, and for facilitating the panel discussion (see cover story).

Following a visit to the Grains Research and Development Corporations (GRDC) in June, Bayer CropScience head of weed control research, Germany, Dr Hermann Stuebler visited UWA and announced a three-year $1.1 million project with the UWA-based Australian Herbicide Resistance Initiative (AHRI). Together with the School of Plant Biology and AHRI, IOA hosted a public lecture during which Dr Stuebler announced 11 new post-doctoral positions from Australia to join the program (see page 7).

I am pleased to welcome a new member to IOA, Ms Debra Mullan, Project Officer for UWA Farm Ridgefield. Debra has fit seamlessly into the team and is working hard to organise the UWA Farm Ridgefield Field Day. If you haven't noted it in your diary please save the date Friday, 11 September 2015. The theme for the event this year is Managing Risk: Climate, Mental Health and Sustainability (see page 5).

As part of IOA's strategic plan (2015-19) we have identified five new and emerging cross-disciplinary themes. The themes are Crop Root and Rhizosphere, Sustainable Grazing Systems, Water for Food Production, Food and Human Health and Agribusiness Ecosystems. The themes are led by researchers from different faculties to foster better interdisciplinary collaboration and harness our capacity in these areas.

I am pleased to see the researchers working together to fulfil our vision of providing research-based solutions to food and nutritional security, environmental sustainability, and agribusiness.

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and Mr Robert Egerton-Warburton respectively who impressed the audience with their experiences in running the family owned businesses.

Mr O'Meehan runs Butterfield Beef south of Borden, near the Stirling ranges. He commented on the number of small operators in the cattle industry and the need to work together if it is to grow and remain competitive.

Kojonup sheep producer Mr Robert Egerton-Warburton is the chair of the WA Sheep Industry Leadership Council and served as a director with the Sheep CRC Board for seven years. He stressed how interrelated the meat and wool industries were and encouraged people to remember they both come from the same animal, and should not be thought of as two.

The final speaker for the day was research economist Professor Garry Griffith from the University of New England. Prof Griffith recapped the economics touched on in the other presentations and said that global food is now dominated by networks of global value chains. He said the Meat Standards Australia (MSA) grading scheme is a great example of consumers' willingness to pay for quality and that retailers could and should leverage better from it. Prof Griffith also proposed a predictive sorting system to enhance the traceability of the retail product, to cater to individual customer needs.

The afternoon was summed up by IOA Industry Advisory Board Member and Founder or Agvise Management Consultants Mr Shane Sander who led a panel discussion that developed on the ideas presented during the forum.

Conversations were continued into the evening with a sundowner reception for all participants.

Social work students at UWA Farm Ridgefield

Social Work meets Agriculture

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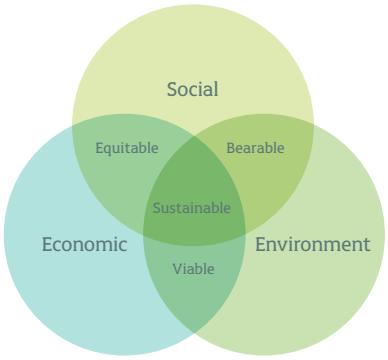
First year Master of Social Work students have the opportunity to undertake a thirteen-week field work placement within IOA, as a result of the partnership between IOA and the UWA School of Population Health.

Initially, we wondered how, as student social workers, we could contribute to the agriculture industry. A closer look showed the importance of strengthening the relationships between food producers and the consumers.

The Future Farm 2050 Project, a multidisciplinary project on UWA Farm Ridgefield, invites social engagement with the public. The project not only aims to promote sustainable farming practices envisioned for the future to the farming communities, but also aims for good neighbourly relations with all stakeholders concerned with the project, and especially the Shire of Pingelly.

To achieve sustainability it is widely accepted that we must balance the economic, environmental and social factors in equal harmony. This relationship may be illustrated with a sustainability Venn diagram:



As social work students, we are attempting to understand how agrarian models can be made effective, to benefit both the larger ecosystem and people as an important sector within that system.

On our visit to the Farm and the Shire of Pingelly we were amazed at how in just a few years the relationship between the UWA Farm and the community had developed.

Our discussions with the Pingelly CRC highlighted how the community saw the relationship as mutually beneficial and how the Farm is being viewed as an important asset of their community.

This is shown by the community scholarship to the Social Work discipline in the UWA School of Population Health and the UWA Farm Ridgefield direction signage they erected.

It was also clear that there were a lot of potential areas of cooperation and that the relationship would continue to flourish. The UWA-Pingelly relationship is creating new opportunities for both the community and university.

The Future Farm 2050 Project serves as an important opportunity to inform social work as we reconcile environmental degradation with restorative practices, economically sustainable food production to ensure humanity's survival in the changing world.

"Early vigour is important for the crop plant to establish and combat with all kinds of biotic and abiotic stresses including weeds and insects," Prof Yan says | Image: Jan Smith

Canola seeds studied for superior strains

Science Network WA
Brooke Hunter

UWA scientists are hoping a better molecular understanding of canola (*Brassica napus* L.) seed germination will enable them to breed superior cultivars, following research into strains that demonstrate contrasting germination speeds.

For approximately one year the researchers evaluated 137 canola accessions, or strains for germination speed in a project led by UWA School of Plant Biology and IOA Professor Guijun Yan.

They studied the seeds which were placed on Petri dishes filled with filter paper and were soaked with five millimetres of deionised water and maintained in an incubator in the dark at 25 degrees Celsius.

They used ten seeds of each accession, with the number of germinated seeds recorded after eight hours and then every two hours for one day.

The accessions were grouped into three categories, fast (F), medium (M), and slow (S) to measure the vigour and growth of each.

In repeated experiments they identified, nine category F (seven per cent) and 12 category S (nine per cent) germination strains.

Although accessions in category F showed significantly faster germination and emergence than those in category S, seedling growth parameters did not differ greatly.

Prof Yan says the results may be due to the measurements they took and the overall statistics and that as the plants grow the difference may become more eminent.

Early seed growth needed to overcome stresses

The researchers identified four accessions with high early vigour and four with low early vigour based on germination speed and seedling characteristics.

They then determined combining germination speed and seedling vigour index would be reliable for evaluating early vigour.

"Early vigour is important for the crop plant to establish and combat with all kinds of biotic and abiotic stresses including weeds and insects," Prof Yan says.

"Fast germination and quick accumulation of dry matter [seedling vigour index] are the two parameters to show that plants can grow faster than weeds and to stand for other stresses.

"We are making crosses between fast and slow genotypes to produce segregating populations to study the inheritance of early vigour."

Prof Yan says subsequent fine mapping and molecular marker development will eventually help them understand the genes responsible for early vigour.

He says identified accessions with early vigour are being crossed with industry elite cultivars to introgress traits to create cultivars with early vigour that farmers can use.

ScienceNetwork
WESTERN AUSTRALIA

UWA Farm Ridgefield Field Day – Managing Risk: Climate, Mental Health, Sustainability

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The UWA Farm Ridgefield Field Day will be held on Friday, 11 September 2015 in Pingelly.

The day will showcase the UWA Future Farm 2050 Project for which the vision is to 'imagine the best-practice farm of 2050 and start to build it now'.

The focus of the 2015 Field Day will be Managing Risk, a pertinent issue for farmers and rural communities. Three key speakers have been invited to discuss managing risk with respect to the climate, mental health in rural communities and farming sustainability.

Assoc/Prof Ross Kingwell, from DAFWA, UWA School of Agricultural and Resource Economics and IOA, will discuss crop yield risk and its implications for agricultural businesses. In many parts of WA's agricultural regions, farms have switched into more cropping. Farm businesses are therefore more than ever exposed to the impacts of yield volatility. Prof Kingwell will discuss where these impacts are felt the most and what farmers and others can do about it.

Prof Geoffrey Riley from the UWA Rural Clinical School of Western Australia will share his experience on issues in Rural Health.

Finally, Mr Kent Hannam, the National Manager (Rural Business, Broker Business) for CGU Insurance, will discuss the rapidly changing face of farming and emerging farm trends, and what these mean for the insurance industry.

Greening Australia has selected UWA Farm Ridgefield as a site for their project to plant 100 hectares of trees and associated understorey on areas identified as requiring rehabilitation to maintain the functionality and productivity of the farm ecosystem. This project is part of the national "20 Million Trees" Program (www.nrm.gov.au/national/20-million-trees) and Member for O'Connor Hon Rick Wilson MP will launch the project on the day.

All attendees will have the opportunity to visit demonstration sites around Ridgefield showcasing some of the current research being undertaken in the UWA Future Farm 2050 Project. The research on Permanent Pastures and the Avon River Catchment Critical Zone Observatory – the first such observatory in the southern hemisphere will be the main highlights.

Prof Graeme Martin, Project Leader of the UWA Future Farm 2050 Project said engaging with the local community is one of the key outcomes of the project.

"Future farming is not just about sustainable agriculture in the traditional sense. It incorporates being valued as a good neighbour by the residents of the local community, the economic development of the local community and even landscape architecture opportunities," Prof Martin said.

Other participants include Talkin' Soil Health, Pingelly SES, Farmsafe WA, Pingelly Men's Shed, and the Pingelly Community Resource Centre (CRC).

All are welcome to attend, please register online at **www.ioa.uwa.edu.au/events/register-field-day** by Friday, 4 September 2015 for catering purposes.

Postgraduate students Joginder Gill, Xiaoyan Qiu, Chandima Ranawana, Adam Jalaludin, Bede Mickan and Tas Thamo with Prof Siddique

Frontiers in Agriculture

From climate change impacts and how plants adapt to changing conditions, to glyphosate use and sheep temperament studies, IOA's Frontiers in Agriculture Postgraduate Showcase sparked interesting debate amongst industry representatives, researchers, students and farmers who attended the annual event on 9 June 2015.

UWA Vice-Chancellor Professor Paul Johnson opened the annual event and noted that postgraduate students play a significant role in the research outputs of the University and commended them for contributing to UWA's top global ranking of 24th for Agriculture and Life Sciences, the highest individual ranking of any university in Australia.

The first student present their findings at the UWA Institute of Agriculture's Postgraduate Showcase was Ms Lyndie Bayne from The UWA Business School and IOA. Ms Bayne outlined the findings of her research into how and why environmental practices are spread between organisations. Ms Bayne conducted interviews with the West Australian Agrifood Sector including supermarkets, government bodies, and industry organisations, and concluded that whilst green practices are spreading through the sector, it is not without its barriers.

"Besides doing it because of enforced legislation and regulations, other reasons for sustainable behaviour is that it makes good business sense," Ms Bayne said.

"However, cost was a real barrier to green practices. One farmer I spoke to said 'it's hard to be green when you're in the red' which is understandable when consumers aren't willing to pay more for green products."

Ms Chandima Ranawana, from the School of Plant Biology and IOA gave an excellent presentation on the role transpiration in ameliorating leaf temperature in wheat. Her topic is of particular interest with the changing climatic conditions, and has practical implications for the development of wheat cultivars for target environments. For example, wheat grown in agricultural areas such as the north-eastern grain belt of Australia where yield depends on stored soil water from summer rainfall would benefit from a slower transpiration response than the Mediterranean-type environment in WA's grain belt.

A topic prompting much interest amongst farmers in the audience was Gene polymorphisms associated with temperament in Merino sheep, presented by Ms Xiaoyan Qiu from the School of Animal Biology and IOA. Xiaoyan discussed her research into genotypic markers that can enable breeders to select for temperament in sheep. "Calmness or nervousness in sheep plays an important role for reproduction, production efficiency, and the stress and welfare of the animals," Xiaoyan said.

Ms Joginder Gill from the School of Earth and Environment and IOA looked into phosphorus dynamics in burnt crop residues and how wheat growth was affected. Joginder became interested in the topic while working with farmers in India on efficient use of resources, and fertilisers in particular. She became interested in the cycling of phosphorus during the burning of residues, a common way to handle excess of crop residues in north India. She hopes her research will help more efficient use of the non-renewable nutrient.

Mr Bede Mickan, also from the School of Earth and Environment and IOA presented his research into plant microbial interactions in soil under water stress, and the symbiotic benefits gained by the *Arbuscular mycorrhiza* fungi.

Bede's PhD focuses on interactions and mechanisms of soil fungi, bacteria and plant growth, which he hopes will lead to clarifying the importance of beneficial microbes' influence on plant performance under water stress.

Rising star in herbicide resistance in weeds is Malaysian student Mr Adam Jalaludin. Adam, who conducted his research with the Australian Herbicide Resistance Initiative (AHRI) and IOA, discussed glyphosate resistance in goosegrass. During his PhD studies, Adam discovered a novel mechanism of glyphosate resistance that confers very high resistance levels to glyphosate. He recommends conservative use of the herbicide and to incorporate other methods of weed control to ensure sustainable glyphosate usage.

Tasked with delivering the final presentation for the afternoon was Tas Thamo from the School of Agricultural and Resource Economics and IOA. Tas gave a thought-provoking presentation on climate change impacts, mitigation policy and their interaction in West Australian Mixed Crop-Livestock Farming Systems.

Members of IOA's Industry Advisory Board Dr Michael Robertson, CSIRO and Dr Richard Williams, CBH Group who chaired the sessions said they were impressed with the research, the excellent presentation skills and the ease at which the student's fielded questions from the audience.

New joint initiative to combat metabolic resistant ryegrass

On the heels of its $45 million partnership with the Grains Research and Development Corporation (GRDC) to develop weed control solutions for farmers, Bayer CropScience has announced it is joining forces with The University of Western Australia (UWA) to combat herbicide resistant annual ryegrass.

Together with funding from the Australian Research Council, the three-year, $1.1 million initiative will involve research conducted by the Australian Herbicide Resistance Initiative (AHRI) based at UWA, which is supported by GRDC, linked with researchers at the Weed Resistance Competency Centre (WRCC) of Bayer CropScience in Frankfurt, Germany.

The project will specifically target metabolism-based herbicide resistance in annual ryegrass, which forms a significant portion of the herbicide resistance profile.

"In some cases it is easy to determine how plants become resistant, while in other cases it's not. One of the most difficult nuts to crack is how ryegrass biochemically breaks down or metabolises herbicide," said AHRI Director and UWA Professor Stephen Powles.

"It's a major threat because if ryegrass breaks down herbicide modes of action that have not been discovered yet, we have problems. This is a very scary resistance mechanism.

"If ryegrass can recognise certain parts of molecules, it will break down herbicide. Ryegrass accumulates genes and this is one of them, but it is formidable."

The project will identify genes responsible for metabolic resistance and seek to inhibit them.

"This can help design new molecules that the genes cannot break down, as well as other ways to inhibit them," Professor Powles said.

"Working with Bayer CropScience in Germany, we have already identified some genes responsible and are looking at inhibiting them. It is a true collaborative effort. This process takes time and it requires sophisticated techniques; it is a win-win collaboration."

In addition to the GRDC partnership, this latest project demonstrates Bayer CropScience's strong commitment to weed control research and developing solutions for farmers worldwide.

In a public lecture at UWA on 5 June 2015, Dr Hermann Stuebler, Head of Weed Control Research with Bayer CropScience in Frankfurt, Germany, said the research would look to develop new strategies for combating metabolic resistance in ryegrass and this would be integrated into the company's wider resistance research program.

"We are extremely excited to announce this second resistance fighting initiative in one week, following the announcement of the Herbicide Innovation Partnership with GRDC," Dr Stuebler said.

"Weed resistance is a rapidly growing problem across the agricultural world, affecting many crops and many different chemical classes.

"Annual ryegrass is one of the key weeds in broadacre crop production in Australia and worldwide. It is of particular concern that it has developed simultaneous resistance against various herbicide classes, limiting weed control options for farmers. This has been due to the degradation of the herbicides caused by the metabolic resistance phenomenon."

He said the project with AHRI aimed to understand this mechanism and its genetic background in order to develop diagnostic tools, create control strategies and assist the discovery of new herbicide classes that overcome multi-resistance.

"Bayer CropScience is eager to utilise these findings to provide Australian and world growers with new, highly effective options to manage weed resistance."

It is estimated farmers lose more than $3 billion a year due to resistant and poorly controlled weeds.

Professor Powles said every serious grain grower knew herbicide resistance was a major cost to their business.

"In WA, a 500-paddock survey says 95 per cent of the ryegrass populations randomly collected across the wheatbelt are resistant to common herbicides."

"Due to resistance, growers have had to do things differently and use different things – and this has cost them money. It is a pain in the back pocket," he said.

Agro-diversity to strengthen the resilience of farmers to climate change and variability

The research group during their meeting in Cape Town

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It is widely recognised that food security is threatened. In marginal areas with small holder farming communities, this is especially so because of the move away from agro-diversity, to modern, genetically uniform plant varieties which exacerbate the risks arising from climatic variability and change.

Adaptation is a key strategy that will shape the future severity of climate change and variability impacts on global food production. A diverse agroecosystem, including polycultures, agroforestry, crop-livestock system, aquaculture, soil and land management, will be more resilient to climatic extremes.

A research group consisting of eight members from the University of Cape Town, South Africa, University of Ibadan, Nigeria, Lilongwe University of Agriculture and Natural Resources, Malawi, University of Pretoria, South Africa, University of Witwatersrand, South Africa, Curtin University, Australia and UWA met in Cape Town in June 2015.

The meeting was held over three days, two of which comprised of intensive brainstorming on potential project ideas, concepts and methodology. The third day involved a field trip to the Swartland grainbelt of the southwest Cape.

The key outcome of the meeting was refining a concept proposal entitled "Agro-diverse farming systems in Africa: potential for improving food and nutritional security in the context of climate variability and change" for submission to potential funding bodies and to the Australia Africa Universities Network (AAUN) for consideration.

The research group agreed the project must be highly collaborative, integrative and interdisciplinary, with contribution of methods and expertise from diverse fields such as agronomy, biology, dryland management, climatology, anthropology, food sciences and economics. Consequently, the methods will be equally as diverse, ranging from climate impact modelling, to on-farm pilot agro-biodiversity plots, including capacity building for application and on-going assessment and trials.

Prof Siddique represented UWA as a member of the research group. The AAUN provided funding support for the meeting through its competitive small grants scheme.

African Postgraduate Students join Animal Biology

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Three postgraduate students from Africa, Yakubu Abukari, Thomas Kioko Mutunga and Mankeane Monica Mofoti, have won prestigious Australia Awards Scholarships for Africa and joined the School of Animal Biology to study for their Masters degrees.

Yakubu Abukari is from Yendi in Ghana. In 2003, he graduated from the University for Development Studies with a BSc in Agriculture Technology, specialising in Animal Science. He had always been fascinated by the idea of sustainable agricultural development and the potential for livestock as a tool for rural development and poverty reduction for farmers in developing countries. Yakubu therefore joined the Ministry of Food and Agriculture (MoFA) where he supervised extension agents who were working to improve the dissemination of agricultural technologies to farmers.

Yakubu is studying for a Master of Agricultural Systems, specialising in animal production. He is expecting to gain insight into Australian agriculture and livestock production systems, discover new ideas for application in Ghana, and enhance his skills in research and communication. In his research project, he is studying strategies to reduce methane emissions by ruminant livestock so as to reduce their contribution to global warming.

Kenyan student, Thomas Kioko Mutunga, has gained a BSc in Animal Production from Egerton University in Kenya and a Diploma in Project Management from the Kenya Institute of Management. He has worked in the Kenyan NGO sector for about five years, implementing community training programmes in agriculture. He has collaborated with the Kenya Agriculture and Livestock Research Organization

New apples and lupin containing foods for improved human health

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Cardiovascular disease (CVD) is the number one cause of death world-wide, killing over 17 million annually. In Australia, close to one third of all deaths are due to CVD, which has an estimated annual cost to the health budget of ~$8bn and total economic cost of ~$15bn.

Increasing the intake of fruits, vegetables and whole grains remains the foundation of dietary approaches to prevent CVD. This alone has the potential to cut CVD risk and associated costs by up to 30%.

Ongoing programs of research at UWA involve development and evaluation of new apples and lupin-containing foods. These foods have the potential to benefit both Australian agriculture and population health.

The research on apples aims to support the development, release and promotion of Australian-bred fruit with the ability to improve measures of vascular health. This program involves extensive collaboration with the apple industry. We have evidence that quercetin, the major flavonoid found in the skin of apples, provides a positive contribution to vascular health. Arising from this research, a new quercetin-rich apple variety has recently been released to Australian apple growers. This apple will become widely available within 5 years, which allows time to evaluate whether its consumption can improve measures of vascular health. It is also anticipated that additional flavonoid-rich fruit will be developed as a result of this program.

Lupin, a major grain legume in WA, is particularly rich in protein and fibre and contains negligible carbohydrate. Lupin-derived food ingredients such as lupin flour can be substituted for refined carbohydrate (usually from wheat) resulting in increased protein and fibre and reduced carbohydrate content of the food. Our studies have shown that this can result in reduced appetite, improved blood sugar metabolism and lower blood pressure. Results of this research has identified prevention and management of type 2 diabetes and associated risk of CVD as the principal future research focus. Future studies will need to establish whether regular consumption of lupin-containing foods can improve blood sugar management, insulin sensitivity and measures of vascular health in type 2 diabetic individuals.

(KARLO) on a project on food and milk safety and co-authored a Dairy Goat Proposal funded by the World Bank through the East Africa Agricultural Productivity Project (EAAPP). He has also collaborated with International Livestock Research Institute (ILRI) on the Red Maasai Sheep project.

Thomas is undertaking a Master of Agricultural Science in which his research project is on aflatoxins and bacteria in feeds and milk. He is also doing some work on effect of fungal metabolites on microbial performance.

Mankeane Monica Mofoti hails from Lesotho, a tiny country landlocked by South Africa. She graduated from the National University of Lesotho with a certificate in General Agriculture, then completed a BSc in Agriculture (Animal Health) at North-West University in South Africa. She subsequently worked at the Lesotho Highland Veterinary Clinic and later for the Ministry of Agriculture and Food Security as a District Animal Production Officer (Livestock Department).

In 2011, Monica heard about the Australian Government Scholarships for Africa while she was visiting DAFWA. She is pursuing a Masters in Agriculture specialising in animal production. She chose UWA because its prestige as a research university made it ideal for broadening her expertise in animal husbandry. Monica expects to take advanced technologies used in Australia back to Lesotho so she can improve livestock production and thus benefit the people of her country.

Monica, Yakubu and Thomas in the animal facility

The Loess Plateau in China, one of the most seriously eroded regions in the world

Help for revegetation of degraded arable land

The Loess Plateau in China is an important agricultural area that has experienced thousands of years of continuous cultivation leading to ecological degradation, a decrease in vegetative cover, serious water loss and soil erosion.

Understanding the relationships between vegetative and environmental variables is important for revegetation and ecosystem management on the Loess Plateau.

Lucerne, a deep-rooted perennial legume, has been widely used in the region to improve revegetation, soil and water conservation, and to enhance livestock production. However, there is little information on how environmental factors influence long-term succession in lucerne-rich vegetation.

Researchers from Lanzhou University, University of Virginia, and IOA aimed to provide a scientific basis for improved management and revegetation decisions for lucerne-rich plant communities, and to promote the sustainability of lucerne planting for revegetation in the semi-arid Loess Plateau region.

Prof Neil Turner from IOA and the Centre for Plant, Genetics and Breeding a frequent traveller to Lanzhou, said they first needed to identify the main environmental variables controlling the succession process in lucerne-rich vegetation such that native species are not suppressed after sowing.

The researchers performed vegetation and soil surveys in 31 lucerne fields and found time after planting was the most important factor affecting plant species succession.

Prof Turner said cutting significantly affected revegetation characteristics, such as aboveground biomass, plant density and diversity.

"Soil moisture content, soil organic carbon, soil available phosphorus, slope and aspect were key environmental factors affecting plant species composition and aboveground biomass, density and diversity," Prof Turner said.

"Long-term cutting can cause self-thinning in lucerne, maintain the stability of lucerne production and slow its degradation and promotes forage for livestock."

The research, which was recently published in the prestigious *Nature's Scientific Reports*, concluded that for effective management of lucerne fields, phosphate fertiliser should be applied and cutting performed.

UWA–UAF collaboration in research and training strengthened

The University of Agriculture Faisalabad (UAF), Pakistan is over a hundred years old making it one of the oldest universities in the country. Ranked number two overall and first for agriculture in Pakistan, the University has a high reputation at both national and international levels.

UWA signed a MoU with UAF in 2008 and developed jointly-funded PhD program. Since then, five PhD students from UAF have successfully completed their studies at UWA and returned to UAF and there are currently four others undertaking their PhD studies.

To date 15 academics and researchers from UAF have visited UWA to undertake joint research with funding from various sources. We have made three adjunct appointments of UAF staff at UWA and published 26 joint scientific papers, one book and eight book chapters.

In May this year, Hackett Professor Kadambot Siddique visited UAF Pakistan to discuss training more UAF students at UWA with Professor Iqrar Khan, Vice-Chancellor UAF and senior management.

UAF has agreed to jointly fund fifteen high quality students from UAF to undertake their PhD studies at UWA in agriculture and related areas. Whilst in Pakistan, Professor Siddique interviewed potential PhD candidates and an agreement to progress the initiative is currently being drafted by the office of UWA's Pro-Vice-Chancellor (International).

While at UAF, Prof Siddique delivered a public lecture on Australian agriculture and global food security, and participated in a workshop on innovative strategies for enhancing production of food legumes. He also visited field sites of the Barani Agricultural Research Institute, Chakwal.

Prof Siddique delivers seminar on Australian agriculture and global food security

Prof Siddique receives his fellowship from Prof V.L. Chopra

National Academy of Agricultural Sciences Fellowship for Director

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IOA Director Professor Kadambot Siddique was elected the 'Foreign Fellow of the Indian National Academy of Agricultural Sciences' for his outstanding contributions to crop science and higher education in agricultural science.

Professor Siddique received the fellowship in person in New Delhi at their Silver Jubilee celebrations on 3 June 2015. He also delivered the Silver Jubilee Lecture entitled Innovations in adaptation to climate change in dry-land agriculture.

Professor MS Swaminathan, a world renowned agricultural scientist affectionately known as the father of Indian green revolution and Dr David Bergvinson, Director General of ICRISAT also attended the function and delivered Silver Jubilee lectures.

During the past two decades Professor Siddique has established strong links between Australian and Indian Institutions engaged in agricultural research and teaching. He has initiated the signing of several Memoranda of Understanding between UWA and Indian Institutions, such as Indian Agricultural Research Institute, Indian Council of Agricultural Research, ICRISAT, National Institute of Plant Genome Research, Punjab Agricultural University, Panjab University, Haryana Agricultural University, Bangalore Agricultural University, Kerala Agricultural University, Kerala Veterinary and Animal Science University, Tamil Nadu Agricultural University and Indian Institute of Technology- Kharagpur.

Together with colleagues from Australia, Professor Siddique has undertaken numerous research projects with these Indian institutions with funding support from Australia (Australian Centre for International Agricultural Research, AusAID, Australian Research Council, Australian Department of Science and Technology, Australia-India Strategic Research Fund, Council of Grain Grower Originations and UWA) and India.

Over the years, he has trained several PhD students and post-doctoral fellows from Indian institutions at UWA, co-authored several papers with these institutions and assisted Indian scientists in organising various international conferences in India.

Professor Siddique actively promotes science and technology collaboration between Australia and India through Australian Academy of Technological Science and Engineering in which he is also a fellow.

Ag students meet industry at careers night

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The annual Agricultural Careers Night organised by the Agriculture Institute Australia, WA Division was yet again a big success this year's event held on 22 April 2015.

Over 100 students from UWA, Curtin, Murdoch and some high schools flocked to the Claremont Showgrounds to discuss career prospects with 16 industry representatives.

Small groups of students moved through prospective employers in ten-minute rotations, in the usual 'speed-dating' format that has worked so well in the past.

Ms Rachael Asquith, President of the UWA Students of Natural and Agricultural Sciences group (SNAGS) said the event was very informative as the speakers gave insights into not just what career paths are available, but what attributes employers are looking for.

"It was great seeing recent UWA Ag Science graduates sitting on the other side, sharing what it's like working in the industry. It is also reassuring to know there are jobs available once we complete our studies," Rachel said.

IOA, who was a major sponsor of the event, was represented by Director Hackett Prof Kadambot Siddique, Profs Philip Vercoe and Graeme Martin, and Communications Officer Diana Boykett.

E/Prof Lynette Abbott and Sanja in the glasshouse at UWA

German student retraces Professor's footsteps to UWA

Sanja Schwalb
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In 2003, a young, eager German scientist Florian Wichern, visited Australia. He worked on several farms in Western Australia and eventually came to UWA to work with E/Prof Lynette Abbott and Prof Daniel Murphy on a project investigating the fungi-bacteria ratio of different soils in Western Australia. Through this project, he established the method of selective inhibition. The work he did at UWA later contributed to his Master thesis.

Twelve years on, Florian Wichern, now a professor of soil science at the Rhine-Waal University of Applied Sciences in Kleve, Germany has connected me, a third-year Sustainable Agriculture student, with the very people who helped shape his academic career.

As part of the study program at the Rhine-Waal University of Applied Sciences, every student has to complete an internship or a regular study semester at a university abroad. As I am interested in soil sciences I wanted to use that opportunity to learn more about soil. I asked Professor Wichern for advice, hoping he might have some interesting contacts, and he did.

I will be working with E/Prof Lynette Abbott's team for five months on a project related to dairy farming. For this project we will investigate the effects that the addition of composted dairy manure has on the soil, particularly the effects on soil microorganisms and soil carbon. We will analyse soil samples from the fields of three dairy farms located near Bunbury.

Besides that, we will also set up a glasshouse experiment to replicate the different treatments from the field within a controlled environment.

There are different rates of compost-applications to be compared. Soil from two farms was collected for the purpose of using it for the glasshouse experiment. This means we will have soils from each farm and we will vary the rates at which we apply compost to these soils. The compost to be used is commercially produced and not made on-farm by the farmer. These compost treatments will be compared to control treatments which do not receive compost.

Since dairy effluent and manure contains significant amounts of carbon and nutrients, compost addition to the soil is expected to contribute positively to the soil microbial communities and their resistance and resilience. Improved crop yields, microbial diversity and function and soil resilience to heat and drought stress are many other benefits of building and retaining soil carbon stocks as suggested by current research into organic amendments to soil.

The results of the project will contribute to the development of best management practices concerning compost addition to soils.

UWA Senior Executive visits IOA

UWA's Senior Executive including Vice-Chancellor Prof Paul Johnson, Senior Deputy Vice-Chancellor Prof Dawn Freshwater, Deputy Vice-Chancellor for Community and Engagement Prof Kent Anderson, Deputy Vice-Chancellor (Education) Prof Alec Cameron, Deputy Vice-Chancellor (Research) Prof Robyn Owens, Chief Operating Officer Ms Gaye McMath, and Director of Government and Corporate Communications Mr David Harrison visited IOA in June 2015.

IOA Director Hackett Prof Kadambot Siddique provided an update on IOA's strategic plan (2015-19), recent achievements and future directions. He reinforced the importance of agriculture in a global, national and local context and emphasised the key role UWA plays in agricultural teaching, research and industry interaction.

"Australia ranks fourth in the world behind Brazil, Argentina and the Netherlands as a net exporter of agricultural products. Western Australia is a major producer or grains, horticultural and livestock products," Prof Siddique said.

"IOA works with internal and external partners to help provide the coming generation of farmers the tools to be both innovative and competitive in the global market."

The Executive were given a brief tour of the glasshouses where they interacted with researchers Dr Yinglong Chen and Dr Sheng Chen and Honours student Ms Jacinta Foley.

Dr Yinglong Chen, from IOA gave a brief on the innovative phenotyping platform for efficient characterisation of dynamic growth and variability in root architecture traits among a core collection of chickpea. The research will help identify genotypes with suitable root traits for better adaption to environment stress.

Dr Sheng Chen from the School of Plant Biology and IOA provided an update on canola pre-breeding research at UWA. As a major node of the National Brassica Germplasm Improvement Program (NBGIP) funded by Grains Research and Development

A lettuce crop devastated by Iris yellow spot tospovirus

Anticipating the likely effects of climate change on viruses

Professor Roger Jones
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Research Professor Roger Jones from the UWA School of Plant Biology, IOA and DAFWA was invited to make major presentations at two cutting-edge scientific conferences held at the Asilomar Conference Centre, Pacific Grove, California from 14 – 20 May 2015. Both conferences were organised by the University of California – Davis.

He gave the opening presentation at the Xth International Symposium on Thysanoptera and Tospoviruses. His presentation, *Anticipating the likely effects of climate change on virus vectors and virus disease epidemics* set the scene for the rest of this highly successful meeting which focussed on the latest successes in international research in the fast moving field of tospoviruses and their vectors.

The Symposium also focussed on the implications of this research for future management of the losses they cause as climate change increasingly hampers their effective management. It emphasised that damaging epidemics of tospoviruses are on the increase especially in tropical countries. They pose a major threat to food security in Africa, Latin America, the Indian subcontinent and South East Asia.

New tospoviruses are emerging from wild plants and damaging cultivated plants at an increasing rate. They and their thrips vectors are advancing polewards as global warming progresses causing mounting concern for production of many important food crops. Strategies to address this problem constituted a major focus of the Symposium.

Prof Jones gave a keynote presentation at a second conference - Enhancing risk driven decision tools for managing insect-transmitted pathogens. His presentation, *Application of epidemiological models to management of disease caused by insect transmitted viruses*, took an epidemiological perspective and focussed on the current position worldwide situation over application of such models.

This included discussion of the successes and future potential of this technology, as well as the failures that can be learnt from. Examples given included the experience in south-west Australia with the four aphid-borne virus predictive models and decision support systems produced though cooperation between UWA and DAFWA.

A field trip to the nearby Salinas valley provided several examples of the havoc being wreaked by tospoviruses in vegetable crops and ornamental plants.

Corporation (GRDC), UWA canola research group is investigating the heat tolerance of canola under field conditions as well as under controlled environments, with the aim to find heat tolerant genes and germplasm with superior heat tolerance for canola breeders in Australia.

Honours student Jacinta Foley showed the Executive the technique she uses to measure wheat roots in rhizoboxes. She is comparing the effects of sowing depths on seedling emergence, tiller production and rooting patterns of two wheat sister lines with contrasting tillering abilities. Jacinta's research is sponsored by the GRDC, Sir Eric Smart Scholarship and the Hackett Foundation Alumni Honours Scholarship.

Jacinta briefs the Senior Executive on her research

Soil Quality becomes a national success

Soil Quality Website

Dr Vanesa Gonzalez-Quiñones
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A national soil quality measurement and extension program has now been established in association with state soil quality champions thanks to GRDC's Soil Biology Initiative II.

The Soil Quality project, led by IOA Associate Director Prof Daniel Murphy, has come to an end and the interactive website **www.soilquality.org.au** and regional traffic lights now contain initial data sets for the three major grain cropping regions of Australia.

Prof Murphy said it has been a unique project for the high level of collaboration.

"A total of 26 collaborators were involved in the project. Together we generated impressive outputs including 1,941 new monitoring sites and analysed 2,829 soil samples," Prof Murphy said.

"There are now a total of 48,835 biological, chemical or physical indicator measurements available online to help farmers make better, more informed decisions on their land."

During the project span from 2010 to 2015, the website registered 71,228 engaged sessions. This number represents when a person is actively using the site and excludes 'bounces'. These sessions have generated 386,266 page views.

Dr Vanesa Gonzalez-Quiñones from the School of Earth and Environment and IOA who has been employed on this project over the past five years attribute's the project's success to the fact that there is nothing like this elsewhere in the world, and that it was so well communicated.

"The wide range of DNA based biological measures, the ability to compare individual test results and the decision support framework, are features that other farmer organisations are interested in further developing," Dr Gonzalez-Quiñones said.

"Ten videos are available through the web site representing three hours of information. These have been viewed 1,435 times with a total viewing time of 571 hours."

To help publicise the online tool, the research team produced 79 new soil quality fact sheets written by 53 authors. These fact sheets were distributed through the website and as printed handouts.

In addition, more than 54 expert panels to discuss how data is interpreted and grower extension workshops were conducted across the three cropping regions to an approximate audience of 2,800 people.

The project generated 48 outputs through the media, magazine articles and a number of research publications and presentations at conferences and workshops.

Sustainable Agriculture Conference

The Third International Symposium on Sustainable Agriculture for Subtropical Regions (ISSASR-3 2015) will be held in Changsha, Hunan Province, China on 18-20 October 2015.

The symposium will address the production and environmental innovation needed for the development of sustainable agricultural policies and practice in subtropical zones worldwide. The Symposium activities will address the following four themes: Asia-Pacific Food Security in the 21st Century; Agricultural Innovation for Improved Productivity; Agriculture, Environment and Climate Change and; Developing the Next Generation of Farmers.

Professor Tony O'Donnell, Dean of UWA's Faculty of Science will speak on *Education and Training* and Prof Matthew Tonts, Head of School, Earth and Environment will speak on *Urban Migration and Rural Decline.*

The conference is being organised by the Institute of Subtropical Agriculture, Chinese Academy of Sciences (ISA-CAS) and UWA Joint Laboratory for Soil Systems Biology. For more information and to register for the conference, visit **http://issasr2015.csp.escience.cn/dct/page/1**

This is a No Fly Zone – Engaging community in fruit fly control

Ms Isabel Arevalo-Vigne
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Isabel Arevalo-Vigne, a UWA PhD student from the School of Agricultural and Resource Economics has been working with the community investigating ways at improving public engagement to participate in active control on their properties.

Controlling fruit fly effectively without the use of traditional organophosphate chemicals has prompted the use of Area Wide Management (AWM) strategies worldwide.

To be effective, the control of fruit fly under an AWM approach has to happen outside commercial orchards and include the households that grow fruit and vegetables susceptible to host Mediterranean fruit fly, Medfly (*Ceratitis capitata*).

From October 2015 there will be a complete ban on the use of Fenthion on horticultural produce. The horticultural industries future of 'living without Fenthion' is closely related to the adoption of combined measures from surveillance, hygiene, baiting and trapping by the general public.

Isabel's research has found that one of the areas that need improving was people's knowledge of the agro-ecological principles behind AWM and of fruit fly control techniques.

This has prompted the development of 'This is a No Fly Zone', a concept to promote community engagement for fruit fly control and that generates information around the Medfly lifecycle to explain, in a friendly way, the why behind fruit fly control.

Explaining the science behind integrated pest management can have a major effect in the adoption of area wide management as the acquisition of knowledge can improve people's confidence in the use of fruit fly techniques.

With the help of a fruit growth calendar of 27 common backyard fruit trees, Isabel was able to explain the prevalence and resilience of fruit fly in urbanised areas within the neighbourhood context and the need to control all year round.

With the help of Rachel Davison, a sustainability student at Murdoch University, Isabel has increased the influence of her project. They have been working with community gardens delivering workshops to explain though basic science how changes in tree shape and foliar density by pruning modifies the fruit tree microenvironment and discourages fruit fly presence. To help public's capacity to deal with this pest, they have explained how attractants work and demonstrated how to use household products to prepare effective traps.

The message has now reached a larger audience through Dawson's nursery which acknowledges the 'This is a No Fly Zone' concept in its 2015 fruit catalogue. Dawson's fruit catalogue includes information on control techniques developed through the research project and was recently emailed to 12,699 individual addresses.

The results and information gathered by this research project will be used to prepare a community engagement strategy for Medfly control in Western Australia.

'Community engagement in biosecurity: evaluating the role of science communication and incentives in area wide management of Mediterranean fruit fly in Western Australia' is a PhD research project supported by UWA and Plant Biosecurity CRC.

Isabel is supervised by Prof Ben White, Adjuct Prof Nancy Longnecker, Prof Ross Kingwell, Prof Iain Walker and Asst/Prof Amin Mugera.

Isabel and Rachel participate at Balingup Small Farm Field Day

Jolene Otway attends the Soil, Big Data and the Future of Agriculture conference

Soil, Big Data and the Future of Agriculture

Ms Jolene Otway, School of Earth and Environment
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On 25 June 2015, I was lucky enough to attend the 'Soil, Big Data and the Future of Agriculture' Conference presented by the United States Studies Centre of the University of Sydney in Canberra. The conference focused on the opportunities and challenges of an increasingly digitised agricultural industry, what lessons we can learn from Australian and International experience to date, and where the future might take us.

"Big Data" (or huge volumes of measured information) is collected at every stage of the agricultural product's journey, from the fields through to waste disposal. It is the collection, cleaning, comparison and interpretation of this data which enables the "Big Decisions".

Nutritional security is a key opportunity to which Big Data contributes and the ability to provide this security for the growing world population through (i) sustaining current production capacity, (ii) plus reducing our demand through waste reduction (both before and after the dinner table) and (iii) plus building on the current capacity through smarter decision making.

The sheer volume of Big Data collected daily leads to both the first opportunity, the wealth of information now available to the farmers for decision making, but also two key challenges: (a) limited upload speeds and (b) the time required to convert data into decision. As a farmer should not expected to be a Vet, they should not be data analysts either. With only about 20% of captured data utilised for decision making, there is a gap when it comes to data collection and the value returned, which both public and private representatives are working hard to close.

The openness of data sharing is critical for advancement of the Australian Agricultural Industry where the value of the whole of the data is greater than the sum of the parts. Competitive advantage through the smart use of that data, rather than the privacy of individual data sets, is encouraged by the Federal Government.

Significant discussion was held on who owns the data, how contracts of data use are evolving and what price is placed on it. Unlike other farming commodities, the data is a "non-rival good" – i.e. it does not depreciate if more people consume it.

So with Big Data comes more interpretive and support roles within agriculture, as well as the need for farmers to embrace this support to compete within future markets. Within these roles, due to the emphasis on data sharing locally and globally, agricultural research will see an expansion of available input data which will enable an increased understanding of global variability impacts and assist the defining of the research context for on-farm application.

Please refer to the following link for presenters and further information on topics – **http://ussc.edu.au/events/Soil-Big-Data-and-the-Future-of-Agriculture-Conference**

SOIL, BIG DATA AND THE FUTURE OF AGRICULTURE
CANBERRA, 25 JUNE 2015

Denis, Laurine and Rose with Asst/Prof Amin Mugera

Postgraduate students investigate food security challenges in sub-Saharan Africa

Three post graduate students from Africa, Denis Abagna, Rose Aawulenaa and Laurine Kithi have joined the School of Agricultural and Resource Economics to study for their Masters degrees.

Denis Abagna, from Ghana is looking into the dynamics of poverty, and in particular the vulnerability to poverty in Ghanaian rural households. Vulnerability to poverty will be assessed based on consumption expenditures in Ghana.

"Ghana-specific literature lacks sufficient poverty vulnerability studies due to the scantiness of panel data," Denis said. "Results from this study are expected to be useful to the government, policy makers and international agencies at the forefront of designing policies to eradicate or reduce poverty."

Rose Aawulenaa, also from Ghana is studying the effect having a male or female parent as the head of the household has on food security and child nutrition in Northern Ghana. Northern Ghana is one of the poorest parts of the country, with a higher incidence of poverty, food insecurity and malnutrition.

"Establishing the influence of gender of head of household will inform policy to protect vulnerable groups from becoming food and nutritionally insecure," Rose said.

Laurine Kithi, is researching the impact Farmer Field Schools has on food security and environmental conservation. Using Western Kenya as a case study, Rose is evaluating changes in food production and agricultural income, and changes in adoption of conservation agriculture technologies in connection with relevant Farmer Field School initiatives.

"Addressing sustainable food security is an important issue in Africa so we need to determine if the current Farmer Field School initiatives are successful, and worthy of continued support and replication, or whether resources should be redirected to other programs," Laurine said.

"The study will provide documented evidence to facilitate decision making by both funding and implementing agencies, as to how the program impacts enhancing sustainable food security in developing countries."

Asst/Prof Amin Mugera from IOA and the School of Agricultural and Resource Economics who is the primary supervisor of the students, said the projects are timely and relevant as the students are employing economics analyses to address real agricultural development challenges facing developing countries in sub-Saharan Africa (SSA).

"Agriculture remains the priority sector in most countries in SSA for achieving food security and improving nutrition status of the population through sustainable farming practices. Therefore, there is need for more empirical studies that can provide policy direction on how to address the many agricultural development challenges in the continent," Asst/Prof Mugera said.

Chinese researchers visit IOA to discuss soil acidification

From left to right, Mr Chris Gazey (DAFWA), Dr Huimin Zhang and Dr Jing Huang (CAAS)

Dr Yichao Rui
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Dr Huimin Zhang and Dr Jing Huang from the Chinese Academy of Agricultural Sciences (CAAS) visited IOA from 28 July to 2 August to discuss soil acidification and other common issues in agricultural soils between Australia and China.

IOA Associate Director Prof Daniel Murphy and DAFWA Senior Research Officer Mr Chris Gazey, took the delegation to a DAFWA liming trial site and a typical grainbelt farm and held discussions in agricultural science with staff at DAFWA Northam and UWA Soil Science.

Dr Zhang is professor of the Institute of Agricultural Resources and Regional Planning (IARRP), CAAS. He is also the director of Red Soil

Australia Africa Universities Network International Africa Forum

Hackett Professor
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The Australia Africa Universities Network (AAUN) International Africa Forum was held in Johannesburg, South Africa in May this year as side event of the Association of Commonwealth Universities – Smira conference.

The AAUN is comprised of leading universities in Africa and Australia and has African membership from nine institutions in the South, East and West of the continent, as well as ten Australian Universities.

The objective of the Network is to connect researchers and academics through institutional partnerships in order to address challenges facing both continents. To date, the AAUN has identified five key areas of research, namely food security, public health, mining, education and public sector reform.

The AAUN, through financial support provided by the Australian Centre for Agricultural Research (ACIAR), the Federal Department of Education, and the International Mining for Development Centre, has facilitated the establishment of collaborative research projects which include researchers from at least two African and one Australian member university.

The forum was well attended by 60 delegates from nine countries and 31 different organisations and institutions. Prof Kadambot Siddique and Dr Amin Mugera from IOA participated in the forum.

The forum had three objectives which were (i) to provide an update to members on the AAUN's progress and funding opportunities, (ii) to gain insight into the progress of current Partnership Research and Development Fund (PRDF) projects and provide an opportunity for team members to progress their projects to the next phase (such as draft funding proposals or draft publications); and (iii) to provide a forum for AAUN researchers and stakeholders from across both continents to network and collaborate.

Experimental Station, CAAS and the vice director of the Nutrient Cycling and Environment Committee, Chinese Society of Plant Nutrition and Fertilizer Science. His research is on the quality, evolution and improvement of soil fertility based on the soil-plant system under long term fertilisation.

He was particularly interested in the issue of soil acidification in agricultural systems in WA and how it was tackled.

"Soil acidification is a big issue of agricultural soils in China. The success of China in increasing food production to feed the growing population is at the cost of soil degradation. The overuse of synthetic fertilisers has resulted in significant and continuous acidification of the red soils," Dr Zhang said.

"The red soils, which occupy approximately two million km^2 in tropical and subtropical regions of China and contribute 29% of the world's rice production, are usually highly leached and acidic, and deficient in nutrients. Careful management are required in order to maintain food production and sustainability of the ecosystems."

The Red Soil Experimental Station of CAAS, established in 1960, is the oldest agricultural experimental station in China. A number of long-term trials have been established to understand the role, utilisation and environmental effects of nutrients use in these soils. The issues of soil acidification and salinisation on the nutrient use efficiency and crop yield are of particular interest.

WA's soils are some of the oldest and most weathered in the world. Soil acidification has been taken seriously by WA farmers and researchers. Management practices such as liming have been widely adopted to maintain soil pH level.

"Given the similar challenges facing us, there are potential opportunities for researchers from China and Australia work together to tackle this issue," Prof Murphy said.

"The unique long-term trials of fertiliser use with varying pH and stubble management at the Red Soil Station would also be interesting for addressing questions on soil microbial ecology – as both soil pH and organic matter are primary drivers of soil biology. IOA staff have strong expertise in land use management and molecular ecology and collaboration between UWA and CAAS has continued for a number of years as we strive to tackle common problems."

Prof Murphy holds a High-End Foreign Experts Visiting Professorship with CAAS as part his Australian Research Council Future Fellowship that is focused on climate change, greenhouse gas emissions and soil organic carbon.

The forum provided an update to delegates on recent developments in Australian-African funding opportunities, allowed thematic leads to present achievements and challenges from their project streams, and to allowed project teams to work collaboratively towards concrete outcomes.

Prof Siddique is member of AAUN Steering Group representing UWA and Dr Amin Mugera is co-leader of the food security theme.

The Steering Group committed to undertaking four key actions, which are to continue to focus on the identified thematic areas, but to seek other sources of funding in addition to the traditional Australian and African sources; develop guidelines for AAUN branding and promotion of the AAUN brand through presentation of research in publications; formalise membership through a contract; and explore partnerships with Australia Awards in terms of offering bilateral joint programmes (short courses and masters programmes) through AAUN member universities was generally supported.

Members of the AAUN Steering Group

The role of the AAUN secretariat was understood to be one of channelling the information regarding opportunities for bilateral collaboration to member institutions.

The next Australia Africa Forum and AAUN AGM will be held in Canberra in August 2015.

Carmen Saunders Memorial Scholarship in Pasture Science Awarded

Diana Boykett
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The 2015 Carmen Saunders Memorial Scholarship in Pasture Science has been awarded to Mr Abdi Abdi, UWA Master of Agricultural Science (Genetics and Breeding) student from northern Iraq.

Carmen Saunders, a UWA graduate was a valued researcher in the field of perennial and annual pastures with the Department of Agriculture in Esperance who lost her life in a car accident in 1996. The scholarship was established to perpetuate the memory of Carmen, and foster the continuation of her work with perennial and annual pastures in WA.

The award was presented by Carmen's mother, Janet Saunders at an intimate ceremony at UWA in July.

Carmen's brother, Paul Saunders spoke at the ceremony and said his father Bob Saunders, Duranillin farmer Donald Cochrane, along with DAFWA staff were instrumental in establishing the Scholarship.

"It was from this loss that it was felt by Carmen's colleagues, family and friends that Carmen's passion for perennial pasture research should be encouraged where possible," Paul said.

Risk: Staying ahead of the game

Lachlan Hunter (right) with peers in Canberra

Lachlan Hunter
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I was lucky enough to be one of the nine students around the nation awarded the 2015 Grain Growers Innovation Generation travelling scholarship representing the University of Western Australia at the annual conference this year held in Canberra from the 5–8 July.

The conference was relevantly themed "Risk: Staying Ahead of the Game". The conference was filled with many interesting professional speakers from across the grains industry, the attendees of the conference varied from university students to grain growers and people in business to politicians.

One of the interesting topics discussed was foreign investment, as this is cunrrently a big concern in the Eastern States. Over the duration of my time in Canberra, it was really worthwhile to be exposed to all of the difference sectors of agriculture. A few days before the conference, the Federal Government released the Agricultural White Paper. We were able to learn so by hearing from many different perspectives present throughout the industry. It was presented to us from the Parliamentary Secretary to Minister for Agriculture, Senator Richard Coldbeck.

During our last day we were able to participate in an industry tour. We headed to CSIRO, the flagship of Australian agriculture science. There, we heard from key personnel within the organisation about various research projects that are currently being undertaken. We also had the opportunity to view the Grain Quality Research Laboratory along with other features of the organisation while on site.

This was such a great opportunity and really allowed me to put my studies into practice through and also allowed me to develop important networks throughout the three-day conference. I would like to thank GrainGrower, E/Prof Lynette Abbott and Prof Kadambot Siddique for contributing financially towards this great opportunity.

The Scholarship, was first awarded in 2002 to two recipients however lapsed for a number of years after the passing of Bob Saunders in 2004. The Shire of West Arthur who held the funds in a trust approached the Saunders family to reinstate the scholarship.

Abdi received the award on the basis of his recent thesis entitled *Agro-morphological Variation in a Core Germplasm Collection and Key Australian Cultivars of Subterranean Clover (Trifolium subterraneum L.).*

He was supervised by Professor William Erskine, Dr Parwinder Kaur from IOA, and Adjunct Prof Phillip Nichols, DAFWA. He gained a High Distinction for the research paper.

Abdi, whose research was sponsored by the Government of Iraqi Kurdistan has endured much hardship in pursuit of his research thanked the Saunders family and said he would not forget their kindness.

"On behalf of the Saunders family, I would like to recognise the efforts of the people involved, and thank them for their endeavour," Paul said.

Abdi with supervisors and the Saunders family

New Staff

Professor Petra Tschakert
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Internationally renowned Professor Petra Tschakert joined UWA in May 2015 as the Centenary Professor in Rural Development. She is a joint appointment between the School of Earth and Environment and School of Agricultural and Resource Economics. She will also work closely with IOA on agricultural related projects.

Her research activities focus broadly on human-environment interactions and more specifically on rural livelihoods, environmental change, marginalisation, social learning. Prior to joining UWA, Prof Tschakert was with Penn State University, USA.

Her main interest lies in the theoretical and empirical intersections of political ecology, environmental justice, complex systems science and participatory research. It is the result of a long-term commitment to interdisciplinary scholarship and extended periods of field work and capacity building, particularly in West Africa.

Ms Debra Mullan
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Debra Mullan was recently appointed part-time as the Project Officer for IOA's Future Farm 2050 Project. Debra will be working on coordinating the many different facets of the Future Farm 2050 Project including organising the UWA Farm Ridgefield Field Day (Friday, 11 September 2015), acting as Executive Officer for the Future Farm 2050 Project Committee, and supervising two Social Work students during their 13-week placement.

Debra has a BSc in Natural Resource Management, First Class Honours, and also has considerable experience in the agricultural industry. Her previous agricultural experience includes working in wheat physiology (CIMMYT, Mexico) and plant pests and diseases (Plant Health Australia, Canberra). In recent years she has been working on flora and fauna surveys for a commercial consultancy.

Awards and industry recognition

Name	Award
Hackett Professor Kadambot Siddique	Foreign Fellow of National Academy of Agricultural Sciences, India
Professor Ian Small	Fellow of the Australian Academy of Science

Memoranda of understanding (MOU) with external organisations

PMDS – Arid Agriculture University Rawalpindi	Letter of Extension March 2015
ESALQ, University of Sao Paulo Brazil	International Academic Agreement June 2015

Visitors to Institute of Agriculture

Name of visitor	Visitor's organisation and country	Host details	Dates of visit
Mr Antoine Fontan	Ecole d'Ingenieurs de Purpan, Toulouse, France	Dr Michael Considine	6 July 2015 – 2 Oct 2015
Yijin (Cecelia) Zhang	College of Agriculture and Biotechnology, Zhejiang University, Hangzhou, China UWA – USTC/Nanjing/Zhejiang Research Training Program	Dr Michael Considine	13 July 2015 – 28 August 2015
Ms Su Yang	Zhejiang University China Research Council scholarship	Prof Wallace Cowling, Dr Sheng Chen	31 October 2014 – 30 November 2015
Mr Jianyong Wang	Lanzhou University, China	Prof Kadambot Siddique, Prof Neil Turner	May 2015 – April 2016
Dr Jun Li	Chinese Academy of Agricultural Science, Wuhan, China	Prof Kadambot Siddique, Dr Sheng Chen	July 2015 – July 2016

New research funded projects 2015

Title	Funding Period	Funding body	Researchers
Exploiting natural variation to discover tools to increase crop plant yield	2015-2017	ARC Discovery Projects	A/Professor Martha Ludwig, A/Professor Brian Atwell, Dr John Lunn, Professor Mark Stitt
Understanding Biological Farming Inputs	2015-2017	CSIRO ex GRDC	Dr Sasha Jenkins
'Improved subterranean clover seed production from multiple disease resistance	2015-2017	RIRDC	Professor Martin Barbetti, Dr Philip Nichols, Professr William Erskine, Dr Parwinder Kaur
Soil Microbial Processes and Soil Carbon for Dairy Pastures Amended with Compost	2015	South West Catchments Council (NHT)	E/Professor Lynette Abbott, Dr Sasha Jenkins, Mr Ian Waite, Dr Zakaria Solaiman
Scoping study for agricultural development policy review for Vietnam food security	2015	ACIAR	Dr Elizabeth Petersen
Emerging Foliar Diseases of Canola	2015-2017	GRDC	Professor Martin Barbetti
Australian Herbicide Resistance Initiative - Phase 5	2015-2019	GRDC	Professor Stephen Powles
Membrane transporters mediating 2, 4-D resistance in Wild Radish	2015-2018	ARC Linkage	Professor Stephen Powles, Mr Andrew Wells
Defining the Brassica Pan-genome and Establishing Methods for Gene Conversion Based Crop Improvement	2014-2016	ARC Linkage	Professor Jacqueline Batley, Professor David Edwards, Mr Benjamin Laga
An International Collaborative Effort to Sequence the Genome of Field Pea (Pisum Satiuvum) A Key Tool for Future Breeding	2014	Curtin University ex GRDC	Professor Jacqueline Batley, Professor David Edwards
National Brassica Germplasm Improvement Program – Phase II	2015-2019	GRDC	Dr Sheng Chen, Professor Kadambot Siddique, Professor Wallace Cowling
Do increased herbicide use impact on key soil biological processes?	2014-2017	NSW DPI ex GRDC	Dr Gavan McGrath
Development of Lupin Molecular Markers Tagging Yield QTL Genes & Yield Related Phenology Traits	2015-2018	DAFWA ex GRDC	Dr Matthew Nelson

IOA Publications 2015 (April – July)

Refereed Journals

Abdullah AS, Aziz MM, Siddique KHM and Flower KC (2015) Film antitranspirants yield in drought stressed wheat plants by maintaining high grain number Agricultural Water Management **159**: 11-18

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Dowerin

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Friday, 11 September 2015
UWA Farm Ridgefield, Pingelly

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