THE UNIVERSITY OF WESTERN AUSTRALIA
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L-R: W/Prof Kadambot Siddique (Director, IOA), W/Prof Lyn Beazley (WA Chief Scientist), Mr Rob Delane (Director General, DAFWA), Hon Robyn McSweeney (Minister for Child Protection, Community Services, Women's Interests and Seniors and Volunteering), Mr Ray Marshall (Councillor and Farmer Pingelly) and W/Prof Alan Robson (Vice-Chancellor UWA) viewing a demonstration at the UWA Future Farm Opening.

UWA makes future history

Ms Megan Meates
(megan.meates@uwa.edu.au)

About 200 researchers, industry members and the wider agricultural community, including local farmers and grower group leaders of the region, flocked to UWA Future Farm on November 20 for its opening by Honourable Robyn McSweeney, Minister for Child Protection, Community Services, Women's Interests and Seniors and Volunteering.

With a goal to be clean, green and ethical and reach a carbon neutral target by 2020, UWA's new research farm project is another step forward in leading UWA to be ranked amongst the top 50 universities in the world by 2050.

The UWA Future Farm, based on a 1600ha property in Pingelly, will be home to innovative farming practices, while promoting environmental biodiversity and sustainability and maintaining a profitable crop production enterprise in a drying climate. Above all, the farm will be a good neighbour to its Pingelly community.

W/Prof Kadambot Siddique welcomed the visitors and guests to the Future Farm. Guest speakers at the opening included WA Chief Scientist, W/Prof Lyn Beazley, UWA Vice-Chancellor, W/Prof Alan Robson, Pingelly farmer and Councillor, Mr Ray Marshall, Mr Rob Delane (Director General, DAFWA), Dean of Faculty of Natural and Agricultural Sciences (FNAS), W/Prof Tony O'Donnell, Head of the School of Animal Biology, W/Prof Graeme Martin and Director, WA Herbicide Resistance Initiative, W/Prof Stephen Powles.

W/Prof Robson said that UWA places great emphasis on collaborative work with industry, government and the community.

"This UWA Future Farm will help us to deliver quality graduates and scientists who can continue to deliver the level of expertise demanded by our vital agricultural industry," he said.

W/Prof Robson went on to say that UWA wants this farm to be a best-practice farm, to be a flagship operation that leads State, national and international research into future farming systems.

The launch gave visitors a chance to explore the property and see new research undertaken by UWA scientists and students. A rain simulation model drew crowds as researchers demonstrated a device able to make rain with varying intensity and drop size. Soil profiling was put in the spotlight using a large soil pit to demonstrate how understanding soil profiles can help farmers better manage their land. A methane measuring device was also on display with students demonstrating the portable booth as way to measure methane emissions from sheep in one hour rather than the 24 hours it takes using the currently used fixed booth. Other displays, including an ecological restoration research and the shearing shed model by UWA architecture students, completed the launch's success.

See page 10 and 11.

Director's column

Winthrop Professor Kadambot Siddique (ksiddique@fnas.uwa.edu.au)

In 2009 world and regional issues were dominated by food security, global financial crisis, genetically modified crops, carbon emission, climate change and Afghanistan. Producing 70 percent more food for an additional 2.3 billion people by 2050 while at the same time combating poverty and hunger, using scarce natural resources more efficiently and adapting to climate change are the main challenges world will face in the coming decades. Director-General of Food and Agriculture Organization of the United Nations (FAO), Dr Jacques Diouf warned that international interest in the issue of hunger is waning, as indicated by the absence of some key world leaders at the recent World Food Summit in Rome. He called for greater investment in agricultural research, development, infrastructure and capacity building to overcome hunger and malnutrition.

On a sad note, Nobel Laureate Dr Norman Borlaug, the world's greatest crop scientist, passed away on September 12, 2009. Dr Borlaug's contributions to world agriculture have been outstanding. He was the father of the Green Revolution which transformed global food production and livelihood of millions of people on this planet. Currently, high-yielding, disease-resistant wheat varieties based on Dr Borlaug's work are grown on 60 million hectares worldwide. Let us salute this great scientist and humanitarian for his marvellous contributions to world agriculture and food security.

On the home front nearing the end of 2009, we look back at a year which has taken us even closer to accomplishing the mission of UWA Institute of Agriculture. It is UWA's aspiration to be among the world's top 50 universities by 2050. A few weeks ago, UWA was ranked 113 in the world in the Shanghai Jiao Tong University's Academic Ranking of World Universities – up another 14 places from 127 in the world last year. However, we are already ranked in the top 50 in the world for Life and Agricultural sciences.

On an International level, we have exceeded our expectations with active collaborations established with various esteemed Universities in China, India, Pakistan and Malaysia.

IOA continues to play an important role expanding the capacity of Iraqi agriculture. Early this year we have had ten of Iraqi graduate agriculture students join UWA to study for their Master of Science degrees in Animal Science, Plant Pathology, Genetics and Breeding and Agricultural and Resource Economics. Now we also have six PhD students from the University of Agriculture, Faisalabad (UAF) as part of the collaboration between UWA and UAF.

In November this year, UWA also hosted the OECD Co-operative Research Programme Sponsorship for the international conference "Exploiting Genome-wide Association in Oilseed Brassicas", UWA. This drew plant breeders and molecular biologists across the globe onto UWA's doorstep. I would like to congratulate Professor Wallace Cowling and his team for their excellent efforts in organising the above conference with support from OECD, GRDC and UWA.

UWA continues to lead in agricultural research and teaching with particular relevance to WA and Australia as a whole. Several ARC linkages; GRDC funded; and other projects headed our way, keeping UWA at the forefront of agriculture. UWA has purchased an impressive 1,588 hectare farm in the Shire of Pingelly. UWA's Future Farm was officially launched on November 20 this year. Through UWA Future Farm we hope to be a world-leader when it comes to animal and crop production, and research into environmental sustainability and community relationships.

Through participation at the Dowerin Field Days, our Industry Forum, Postgraduate Showcase and several thought provoking Food and Agriculture lectures, the IOA makes a strong connection with the community.

Please join me in applauding the outstanding level of teaching, research and leadership displayed in agriculture at UWA during this year. I look forward to your continued support in IOA initiatives to attaining our vision: *to be recognized for excellence in serving agriculture and the management of natural resources through research, education and training in a regional, national and international context.*

I wish you all a wonderful festive season and look forward to a peaceful and rewarding New Year.

Assoc/Prof Helen Spafford, middle, with some of the student presenters at the Student Research Conference.

Student research conference

Students undertaking research projects as part of their four year degree, end-on Honours degree, or a Postgraduate Diploma in the Faculty of Natural and Agricultural Sciences (FNAS) are required to give a seminar near the conclusion of their research project.

The Student Research Conference, held from October 6-7, 2009, presented these research talks in a series of concurrent sessions over two days. Some of the agriculture related topics of the day included "Alpaca fibre production and its influence on thermal insulation" (Ms Kelsie Moore), "Does the KISS principle apply to broadacre farming in Western Australia" (Mr Joseph Sgambelluri), "Climate change impacts on profitability of wheat production in south-Western Australia" (Katrina Sasse) and "Germination requirements and seed enhancements to improve the broad acre restoration of the woody perennials, *Acacia acinacea*, *Enchylaena tomentosa* and *Einadia nutans*" (Mr Andrew Naskos).

The conference were coordinated by Assoc/Prof Helen Spafford, Coordinator of the Conference, and Assoc/Prof Patrick Finnegan were Coordinator Botany and Conservation Biology Honours programs.

Linking practical plant breeding and association genetics

UWA hosted 80 of the world's leading scientists from 13 countries at the first OECD-sponsored conference held in WA – the topic was Genome-wide association mapping. The Grains Research and Development Corporation (GRDC) and UWA were the event's co-sponsors.

Speaking at the event, UWA Vice-Chancellor, W/Prof Alan Robson said that this important conference comes at a time when major advances are occurring through genome association mapping in humans, animals and some plant species.

"The challenge of this conference is to provide plant breeders with a clear path towards the application of association mapping to plant genetic improvement," W/Prof Robson said.

The keynote speaker at the event was a world expert in the human genome: Professor Bruce Weir, Chair and Professor of Biostatistics, and Adjunct Professor of Genome Sciences, at the University of Washington, USA. Prof Weir is Director of the GENEVA project, a consortium of 14 whole-genome studies.

Conference convener, Prof Wallace Cowling, Deputy Director of UWA's International Centre for Plant Breeding Education and Research (ICPBER), said the invitation to Professor Weir to spearhead the conference was motivated by his bio-statistical experience – considered to be invaluable in guiding plant scientists in the area of association genetics, which while highly developed in humans, is just starting in plants.

"The conference is of vital importance to plant breeders and molecular geneticists and will challenge plant breeders with the new technologies of genome association-mapping emerging from human and animal genetics," he said.

The OECD-invited speakers were international experts in molecular marker discovery, plant genetic mapping, new biometrical approaches to plant breeding, human genetics and animal breeding.

The OECD Co-operative Research Program's Biological Resource Management for Sustainable Agricultural Systems funded the 16 invited international speakers to travel to Perth. A number of PhD students, representing the future of plant breeding, also attended courtesy of GRDC sponsorship which allowed a generous subsidy to students at this conference.

According to Prof Wallace Cowling one of the unique aspects of this conference is the link that is made between practical plant breeding and association genetics.

"Issues relating to genotype/environment interaction in plant breeding must be addressed for association genetics to have a serious impact on plant breeding. Once these issues are resolved, I am convinced that a new revolution in plant breeding will quickly spread throughout the world of crop breeding," he said.

L-R: Hon Terry Redman (Minister for Agriculture; Forestry; Minister Assisting the Minister for Education), Prof Ervin Balazs (Department of Applied Genomics, Agricultural Research Institute, Hungary; OECD representative), W/Prof Alan Robson (Vice-Chancellor, UWA), W/Prof Kadambot Siddique (Director, IOA), Prof Wallace Cowling (Deputy Director, ICPBER) and Prof Willie Erskine (Director, ICPBER).

Prof Kingwell (2nd from right) with Prof Nan Zhibiao (2nd from left) and his colleagues at Lanzhou University.

Visit to Lanzhou University

Prof Ross Kingwell
(rkingwell@agric.wa.gov.au)

UWA and Lanzhou University's (LZU) active collaboration were evident early August when Prof Ross Kingwell from the School of Agriculture Resource Economics (SARE) and Department of Agriculture and Food WA (DAFWA) was invited by Prof Nan Zhibiao to review Lanzhou University's undergraduate and postgraduate degrees in agricultural economics and resource management. Both universities join forces on various aspects of agriculture and natural resource management.

"There is a growing interest in the role that economic analysis can play to assist in farm and regional development and help with environmental protection," Prof Kingwell said. He highlighted changes in the course structures to provide better training in agricultural economics and resource management. This will ensure their integration with other agricultural science disciplines. "Exploring topical agricultural and environmental problems was one way to showcase to new students the role and value of agricultural and environmental economics," he said.

The Gansu province in China, which is served by Lanzhou University, has many interesting agricultural and natural resource challenges. Rainfed cropping and rangeland animal production are key components of the region's agriculture. The region's key research challenges are to boost the profitability of agriculture whilst lessening its adverse environmental impacts. "UWA researchers have much to offer in research knowledge and research training," Prof Kingwell argued.

Prof Kingwell lectured to around 100 staff and postgraduate students of the university's College of Pastoral Agriculture Science and Technology. They were all keen to develop research links with UWA.

Guangzhou collaboration on plant stress resistant genes

Guangzhou University (GZU) was established in 1927 and rebuilt in 1983. This University is jointly run with five Colleges by Guangzhou Municipal People's Government and Guangzhou Provincial People's Government in 2000. It offers a wide variety of subject areas and complete disciplines. W/Prof Kadambot Siddique, Director IOA, visited GZU's School of Life Sciences from October 30 to November 7.

Two years ago, GZU signed a general MoU with UWA when their President, Prof Jianshe Yu, visited UWA. There are significant collaboration existing between GZU and UWA in Engineering and English Language training.

Professor Peiguo Guo and his colleges visited UWA late last year and have had several discussions with academic staff within IOA. In May this year W/Prof Siddique and Assoc/Prof Yan made a brief visit to GZU (on their return trip from Lanzhou University) and delivered several lectures.

W/Prof Kadambot Siddique was invited to deliver a keynote paper entitled "Physiology of drought resistance in *Brassica sps*" at the "Symposium on plant stress resistance biology 2009" at Guangzhou University. This symposium was attended by over 150 postgraduate students and researchers. There were eight other key note speakers from USA, Japan, Egypt, Syria (ICARDA) and China. W/Prof Siddique also attended the official opening of Guangzhou's Key Laboratory for Functional Study on Plant Stress Resistant Genes. This laboratory is supported by Guangzhou Municipal City Council.

During the visit, W/Prof Siddique enhanced the relationship between UWA and Guangzhou University in the area of abiotic stress resistance and crop genomics research (including the establishment of a joint research laboratory between Guangzhou University and UWA). He and Ms Eva Chye had discussions with Prof Jianshe Yu (President), Prof Shuang Chen (Vice-President), Prof Yi Li (Director International Relations) and Prof Peiguo Guo regarding existing collaboration between GZU and UWA. Prof Jianshe Yu expressed his appreciation of the active collaboration already achieved with UWA. They discussed establishment of a joint (GZU and UWA) laboratory in the area of crop stress resistance (abiotic) and genomics with Professor Guo as the leader. Initially such a joint laboratory would focus on barley, rice and *Brassica sp*. Prof Jianshe Yu offered his full support in the establishment of such a joint Centre. An invitation was extended to the President, Vice-President and Director of International Relations to visit UWA early next year.

W/Prof Kadambot Siddique was conferred as Guest Professor of Gunagzhou University for a period of three years by Vice-President Prof Yongheng Chen in a special ceremony on November 2.

GZU President, Prof Jianshe Yu during discussions with W/Prof Kadambot Siddique

Promoting UWA agriculture at Dowerin Field Days

The Institute of Agriculture (IOA), as part of its Technology Exchange and Outreach program, showed its commitment by attending the Dowerin Field Days from 25-26 August for the third consecutive year.

The IOA's display showcased some of the latest agricultural research at UWA. Field Day goers could get information on the IOA, FNAS undergraduate courses, *Ascochyta Blight* resistant chickpeas, salt tolerant wheat, glyphosate resistant ryegrass, novel pasture species, Soil Quality website, biochar and a mulesing survey. The IOA Communication Officer, Mrs Erika von Kaschke, and FNAS Marketing Officer, Mrs Chris Hale, ran the booth situated in the Education Pavilion.

The involvement of IOA in the Dowerin Field Days, which attract over 16,000 people, is a useful promotional exercise to illustrate the educational opportunities and research capabilities in natural and agricultural sciences at UWA. The majority of the visitors to the display were farmers, parents of primary and secondary school students, or students enrolled at UWA or other tertiary institutions.

Thirteen Deans from six Chinese agricultural universities and UWA researchers.

UWA and Chinese Deans test waters of collaboration

Thirteen Deans from six agricultural universities around China visited UWA at the end of August for a three-day workshop on agricultural research and education for tomorrow.

The workshop aimed to develop plans for collaborative research in livestock and pastures; and plant biology and agriculture. The visiting Deans delivered presentations at the workshop, showing their university profiles, achievements in agricultural research and education, and areas of potential collaboration with UWA. These universities have long histories in agricultural teaching and research similar to UWA. They also visited FNAS's laboratories and other research facilities on the campus and the Shenton Park Field Station.

UWA participants included W/Prof Tony O'Donnell (Dean of FNAS), W/Prof Kadambot Siddique (Director, IOA), W/Prof Graeme Martin (Head, School of Animal Biology) and W/Prof Hans Lambers (Head, School of Plant Biology).

According to Res/Assistant Prof Shimin Liu (Chinese Relations Co-ordinator Animal Biology), the visiting Deans were impressed by the world-leading position of UWA in agricultural research and teaching, the research facilities, and by the efforts of UWA to establish and strengthen long-term partnerships with renowned Chinese universities.

Grass-roots reclamation

Ms Erika von Kaschke
(Erika.vonKaschke@uwa.edu.au)

Prof Martin Fey showing the extent of kikuyu growth in amended bauxite residue.

Bauxite residue or red mud is a by-product produced from the alumina industry. The worldwide annual production is estimated at 70 million tonnes. Depending on grade, between a half and two-thirds of every tonne of bauxite mined stays behind after refining to alumina. Disposal of the residue remains an issue of great importance with environmental implications. Companies such as Alcoa World Alumina Australia and BHP Billiton Worsley Alumina, who are aware of their ecological footprint, have joined forces with UWA to research the reclamation of soil from red mud.

Red mud, an insoluble product, has a solid concentration in the range of 10-30%, and its pH is about 13. After amendment with gypsum, the pH drops to around 9. Coupled with salinity, the medium is still unfavourable for plant growth.

Professor Martin Fey, Professorial Fellow in the School of Earth and Environment, funded jointly by Alcoa and Worsley Alumina, spent the last six months working to see if the rehabilitation of bauxite residue can be accelerated. According to him, kikuyu grass (*Pennisetum clandestinum*), an exotic, creeping perennial, widely grown as a pasture and turf species in Australia, grows "amazingly" well in sodium-rich media. "Eventually, we are hoping to find out whether grasses such as kikuyu can be used for soil building," he said. He claims that one of the best ways to get organic matter back into soil is through grass.

Prof Fey and his research team, including students Ms Neha Kaur and Mr Cameron Elliott, treated bauxite residue by adding gypsum, phosphoric acid and other inorganic nutrient salts before planting the kikuyu from sods of turf. (The locally developed variety, Village Green, is particularly vigorous and produces negligible seed which makes it effectively non-invasive). High levels of nitrogen as ammonium sulphate were also added and leaching water was applied to remove excess salt. The growing medium was also inoculated prior to planting with a handful of garden soil to introduce bacteria into the root zone.

"We call the process biotitration, in which bacteria convert the ammonium sulfate into nitric and sulfuric acids which, together with carbonic acid from the respiration of the grass roots, help to neutralise alkaline substances remaining in the residue," Prof Fey said. "At least that is the intention – we still need to conduct careful analyses of the growing medium to find out how much alkalinity has actually been neutralised" he added.

Only three months after being sown, the kikuyu has lived up to its reputation as a vigorous performer. The dry matter yields have been on a par with anything that can be obtained in a fertile soil. The potential of grasses like kikuyu (there are some native Australian species that will be tested in future experiments) could facilitate the eventual establishment of a mixture of plant species selected for their ecological suitability. "Some people consider kikuyu an enemy because it takes over" said Prof Martin Fey "but after discovering its potential for healing disturbed environments we might treat it as a friend".

The first prize went to "Pretty In Pink" by (L-R) Ms Stephanie Newland, Ms Claudia McGrath and Ms Abigail Garay.

Winners of Most Innovation in Agriculture, "Plantastic Peas" (L-R) Mr Aidan Porter, Ms Amanda Emery, Ms Jessica Vaini and Ms Cayley Jones.

2009 PICSE Science Investigation Awards

Ms Belinda Pope (belinda.pope@uwa.edu.au)

150 year ten students attended the PICSE Science Investigation Awards, a new initiative in the PICSE (Primary Industry Centre for Science Education) project, held in the Undercroft of Winthrop Hall at UWA on Monday, November 16.

Ms Belinda Pope, a PICSE Science Education Officer at UWA, has worked with year ten science classes from five metropolitan schools: Mercy College, Mirrabooka SHS, Morley SHS, John Forrest SHS and Lockridge SHS to investigate a topic of their choice, either individually or in groups. After a few weeks of planning, designing and investigating, the students presented their investigation and findings on a presentation board for judges.

"There were many excellent investigations with some very innovative topics and wonderful presentation boards", Ms Pope said. The winners of this event were outstanding in their chosen investigation topic, carrying out their investigation, and in their presentation on the day. The winning submission came from John Forrest Senior High School's Ms Abigail Garay, Ms Claudia McGrath and Ms Stephanie Newland. They investigated the pigment components in different flower varieties with a similar petal shade, entitled "Pretty in Pink". WA's Chief Scientist, W/Prof Lyn Beazley, handed the winning team their cheque of $500 sponsored by Optima Agriculture.

Mercy College runners-up, Ms Jessica Anderson, Ms Amy Le and Ms Paige Jenner's investigation entitled "Liquid Armor-Cracks Or No Cracks" earned them $300. The third prize of $100 went to Mirrabooka SHS students Ms Julie Gorsevski, Ms Colleen McDonald and Ms Holley Olney's "Heart Racers. They investigated the effect of selected energy drinks on one's heart rate. They also won The Most Innovative Award and $50, selected by students who attended the event.

One of the awards for the evening, commemorating the collaboration between FNAS and PICSE, was investigation showing "The Most Innovation in an Agricultural context". Mercy College students Ms Amanda Emery, Mr Aidan Porter, Ms Jessica Vaini and Ms Cayley Jones took the honours for their investigation entitled, "Plantastic Peas". Their investigation looked at different types of fertilizers and how they effected the growth of pea plants. Students who attended this event said that the SIA has given them insight into a career in science. Other said: "It has opened my eyes as to how science is applied in real life."

Some of the distinguished guests included Mr Paul O'Halloran, PICSE Manager of Innovation and Delivery (The University of Tasmania) and W/Prof Kadambot Siddique (Director, IOA). W/Prof Siddique presented the Award for The Most Innovative in Agriculture. Judges on the day were scientists, and some additional valued members of the community including Ms Adele Carles, Greens WA member of the Western Australian Legislative Assembly.

L-R Ms April Curatolo (Department of Primary Industries Victoria), W/Prof David Pannell, Dr Anna Roberts (Department of Primary Industries Victoria), Mr Geoff Park (North Central Catchment Management Authority) and Res/Assist/Prof Sally Marsh.

Eureka! Excellence in research

Researchers from The Faculty of Natural and Agricultural Sciences (FNAS) and Institute of Agriculture at UWA are part of a $10,000 Eureka Prize-winning team for a project that helps governments and environmental groups work out how to best spend their 'green' money.

The Australian Research Council Eureka Prize for Excellence in Research by an Interdisciplinary Team was awarded to Prof David Pannell and Res/Assist/Prof Sally Marsh of UWA's Centre for Environmental Economics and Policy. The Australian Museum Eureka Prizes are the most prestigious awards in Australian science.

The team's project, INFFER – Investment Framework for Environmental Resources – integrates biophysical, economic and social research to help governments and managers make wise decisions about investing in threatened environmental assets. INFFER gives scientific knowledge a workable economic framework. It focuses on environmental problems in rural areas, including protection of biodiversity and native vegetation; soil erosion; water quality in rivers, lakes and wetlands; environmental pests; threatened species; and salinity.

INFFER is used in assessing environmental assets of national importance, such as native forests threatened by dieback, the Gippsland Lakes in Victoria, and the Hamersley Ranges.

Other researchers who are part of the larger INFFER team employed at UWA include Res/Asst/Prof Maksym Polyakov (biodiversity modelling), Res/Asst/Prof Morteza Chalak (weed modelling), Dr Graeme Doole (water quality modelling), Ms Fay Davidson (policy research).

UWA masters at aiding Iraq

UWA and its Institute of Agriculture (IOA) continue to play an important role expanding the capacity of Iraqi agriculture; training Iraq's brightest and best graduate agriculture students.

Ten graduate students joined UWA early this year to study for their Master of Science degrees in Animal Science, Plant Pathology, Genetics and Breeding and Agricultural and Resource Economics at UWA. They are currently employed by the Iraqi Ministry of Agriculture, and funded by Australia-Iraq Agricultural Scholarships provided by the Australian Government under the AusAID Scholarship Program.

"Iraqi agriculture faces some very serious challenges from declining production, low crop yields, poor research and extension services and low prices," IOA Director, W/Prof Kadambot Siddique said.

"Drought from 1999 to 2001 and 2007 to 2009 significantly reduced production leading to increased import of grain to Iraq. This year, ten outstanding Iraqi graduate students at UWA will be well trained to address those challenges."

Agriculture provides about eight per cent of Iraq's GDP and 20 per cent of its employment, supporting seven million people of a total population of 26 million. The United Nations Food and Agriculture Organisation (FAO) estimates that 11.5 million hectares of Iraq is arable, but of the eight million hectares used for agriculture, less than half is cultivated annually. Most of that cultivated area is in the central and southern regions, but wheat, the staple food crop, and barley, an important livestock crop, is concentrated in the north.

Zero Tillage machinery demonstrated in Northern Iraq as part of the Iraq/Australia/ICARDA project.

The IOA is also involved in a large project, 'Development of conservation cropping in the drylands of northern Iraq', in partnership with the Syrian-based International Centre for Agricultural Research in the Dry Areas (ICARDA) and supported by the Australian Centre for International Agricultural Research (ACIAR) and AusAID.

In September W/Prof Siddique met with Iraqi Agriculture Ministerial staff, ICARDA and Australian collaborators in Aleppo, Syria, to discuss the conservation cropping project's progress and future direction. This includes two Masters students and one PhD student from Iraq joining UWA early next year. While in Syria, he also discussed UWA's involvement with further capacity building in Iraq with His Excellency Robert J Tyson, Ambassador, Australian Embassy, Baghdad.

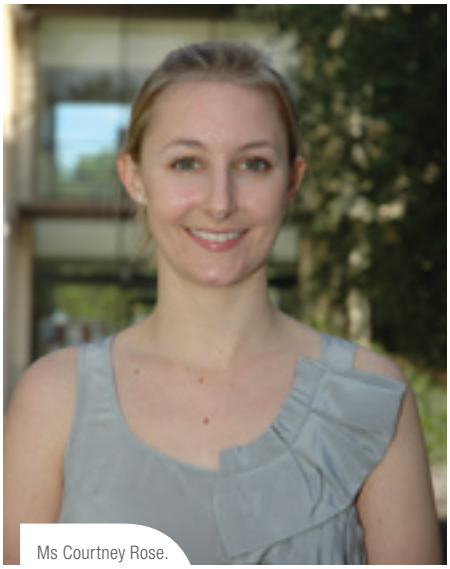
W/Prof Tony O'Donnell, Dean of the FNAS, said the Iraqi graduate students were not the University's only contribution to improving Iraqi agriculture. "Last year 27 Iraqi agricultural scientists completed a short course on integrated plant disease management and in August another group studied soil fertility and land management at UWA as part of AusAID's capacity building program in Iraq.

"The major outcome of UWA's assistance to Iraqi agriculture is helping the country's national agricultural agencies develop sufficient technical capacity to plan, implement and monitor R&D programs that will make it more self sufficient in food," W/Prof O'Donnell said.

Ten Iraqi graduate students joined UWA to study Master of Science degrees in Animal Science, Plant Pathology, Genetics and Breeding and Agricultural and Resource Economics.

PHOTO: BRENDON CANT AND ASSOCIATES

PHOTO: BRENDON CANT AND ASSOCIATES



Ms Courtney Rose.

Ms Aanandini Ganesalingam.

Innovative thinkers key to future of agriculture

New research topics completed by two innovative fourth year agricultural science students at UWA could play a key role in the development and adoption of grain varieties by WA growers. Both topics come off the back of fourth year research project scholarships funded by Cooperative Bulk Handling (CBH).

According to UWA Institute of Agriculture Director, W/Prof Kadambot Siddique, they can make immediate impacts on the WA grains industry. "One reveals that the royalty system used to fund most plant breeding could profoundly affect innovation, while the other shows we're in danger of prematurely discarding some canola varieties that can still provide good resistance to blackleg disease," he said.

Completing a double degree in agricultural science and commerce, Ms Courtney Rose, researched the modern funding system for commercial plant breeding because of its important role in sustaining innovation and raising yield performance across WA.

Currently there are two royalty systems used today: 'seed royalty', where growers pay an upfront premium on seed for new varieties and 'End Point Royalty' (EPR) system, where growers pay a lesser amount for their seed upfront and then pay a set rate per tonne when the grain is sold.

Ms Rose, supervised by Prof Ross Kingwell (UWA School of Agricultural and Resource Economics and DAFWA), and UWA E/Prof Bob Linder, researched which system struck the best balance between profitability for the farmer and the plant breeder. She used a computer modelling system to account for more than 5000 different scenarios that could affect the performance of a given wheat variety over 10 years of farming.

"Our model found that irrespective of the intellectual property right employed, being a seed royalty or an EPR, it was optimal for farmers to purchase enough seed to allow them to bulk-up their seed over one year." Ms Rose said.

Farmers bulking-up their own seed on farm and retaining it for use in future seasons, reduced the potential revenue streams for plant breeders using seed royalties. EPRs help overcome the problem of farmer saved seed limiting return on plant breeders' investment. As an annual payment, EPRs could affect ongoing farm profitability. Despite representing a greater cost to farmers than a traditional seed royalty over a 10 year period, EPRs can create far greater revenue streams for plant breeders, especially if the variety is very successful.

The second CBH scholarship holder at UWA, Ms Aanandini Ganesalingam, made valuable discoveries about existing varieties in the canola industry, which could help local growers make better informed choices on what to grow in their home regions. Ms Ganesalingam also received a GRDC scholarship for her fourth year project at UWA.

Because of previous blackleg outbreaks, growers judiciously choose varieties and anxiously watch for any forewarning of a breakdown in blackleg resistance. The Australian Canola Association (ACA) has independently tested varieties at multiple locations across the country and published their disease resistance ranking according to how they performed. Although useful, the national variety disease resistance ratings may overlook important interplay between varieties and their growing environments, leading to variable disease ratings over years. Constant changes in the Canola Association of Australia disease ranking categories prompted Ms Ganesalingam to closely look at the patterns, examining seven years of data from across Australia. She found some varieties earmarked as losing resistance actually still held up well.

"The disease pressure experienced by a variety can change from year to year, based on factors such as weather and stubble source, but when encompassed in a longer term analysis, you see many varieties classified as having an erosion of resistance are quite stable in resistance."

"Major gene resistance is significant in preventing disease incidence, however over time the prolonged exposure of this form of cultivar resistance to diverse populations of blackleg enables selection of populations able to attack this form of resistance," Ms Ganesalingam explained.

"My research indicated incidences where fungal spores residing on the stubble of major gene resistant varieties over summer were much more likely to break down the resistant varieties grown the following year."

Her project, supervised by UWA School of Plant Biology Prof Wallace Cowling and Dr Cameron Beeck of Canola Breeders WA (CBWA), was part of her double degree in agricultural science and economics. Next year Ms Ganesalingam will work as a statistician with the Department of Defence in Canberra, before returning to UWA and its IOA to undertake her PhD research.

W/Prof Kadambot Siddique and the Deputy Minister of Higher Education, Syria, Hon Dr Maher Kabakibi.

Linking with Syria

During his recent visit to Syria, W/Prof Kadambot Siddique (Director, IOA) met with the Deputy Minister of Higher Education, Syria, Hon Dr Maher Kabakibi.

The Syrian Minister showed keen interest in postgraduate training of selected high quality Syrian graduates at UWA in engineering, science, medicine, agriculture and natural resource management. On behalf of UWA Vice-Chancellor, W/Prof Alan Robson, W/Prof Kadambot Siddique extended an invitation to Dr Kabakibi and the Minister of Higher Education, Hon Dr Ghias Barakat, to visit UWA early next year where they would be able to meet senior Executives, relevant Deans and Faculty members. A Memorandum of Understanding (MoU) is likely to be signed between the Ministry of Higher Education Syria and UWA during their visit.

New project measuring soil carbon for climate change

Ms Jennifer Carson
(jennifer.carson@uwa.edu.au)

UWA and the Department of Agriculture and Food Western Australia (DAFWA) are helping farmers increase soil carbon to adapt to climate change and improve soil fertility. This project is part of a national research program funded by the Department of Agriculture, Fisheries and Forestry (DAFF) and the Grains Research and Development Corporation (GRDC).

In future, carbon stored in agricultural soils may be used in emissions trading schemes to offset greenhouse gas emissions. Organic carbon in soil also has a range of benefits for soil fertility and plant growth. It is yet unknown which Australian soils have the most potential to store more soil carbon.

This project will measure soil carbon stocks across the agricultural region of WA and identify which soil types and land uses have potential to sequester more soil carbon. Assoc/Prof Dan Murphy, from UWA's School of Earth and Environment and Institute of Agriculture says: "This research will help farmers to know whether the soil types on their properties can hold more organic carbon and which management practices will achieve that increase."

Soils have already been collected from the Esperance Sand Plains from perennial kikuyu pastures and annual pastures. Dr David Hall of DAFWA says: "These soil samples will help to determine what existing levels of soil carbon are in south coastal sandplain soils and whether perennial pastures (ie Kikuyu) affect carbon sequestration when compared to annual species". The project will also compare the effect on organic carbon storage in soil of cropping vs pasture and tillage vs no-till.

Mr Mohd Rizal Ariffin, a PhD student, who came from Universiti Putra Malaysia, started his project "Assessing soil carbon sequestration under perennial pastures", funded by the Malaysian Ministry of Higher Education. Mr Ariffin says: "Potential carbon sequestration in agricultural soils is a topic of current political and social interest. As such it is important that research is conducted to generate findings on which to base future policy decisions."

Findings of these research projects will contribute to sustainable soil management and help to ensure the continued viability of the Australian agricultural industry in the face of climate change.

This project is funded by the Australian Government's Climate Change Research Program and includes the WA component of the GRDC's commitment to soil carbon research. The project is a collaborative activity between UWA, DAFWA and the Grower Group Alliance (GGA).

Mr Mohd Rizal Ariffin collecting soils from perennial kikuyu pasture, while the mini back hoe is driven by Dr David Hall (DAFWA).

Dr Ken Street with Prof Willie Erskine.

Seed Hunter explores genetic resources and food security

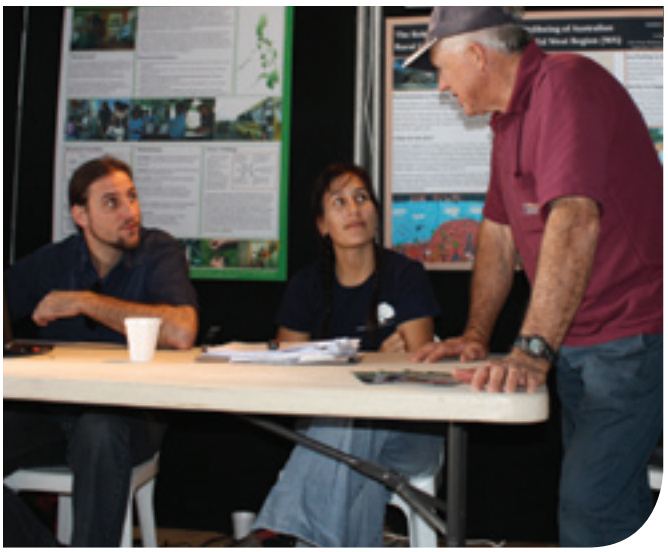
Dr Ken Street, Senior Scientist at the International Centre for Agricultural Research in the Dry Areas (ICARDA) – Genetic Resource Section, or better known as the Seed Hunter, visited UWA in September, to discuss genetic resources and food security.

During the visit to UWA, he said that we are currently facing emerging challenges that will seriously compromise our ability to feed the growing global population. "To meet these challenges we need to redefine the capabilities of our crop plants and raise yields to unprecedented levels. While improved environmental and crop management will certainly contribute, plant breeding remains our most potent tool", he retorted.

According to Dr Street plant breeding has never been more important to human survival than now, but it relies upon the discovery and deployment of new genes that allow crop plants to cope with our changing agro-ecosystems; requiring us to look to the diversity of our ancient crop varieties and their wild progenitors for solutions.

His seminar at UWA described some of the major challenges facing future food production, how our agro-biodiversity is threatened and why its conservation and utilization ultimately underpins our food security.

UWA makes future history



“The UWA Future Farm will be a test-bed for assessing the flow-on effects of innovative farm design and practices on the environment and biodiversity, as well as productivity”.

Prof Alan Robson

Mr Grant Edmonds (AMPC), Dr Natasha Teakle (UWA), Hon Tony Burke (Federal Minister for Agriculture), Mr Kevin Collison (AMPC).

Promising young UWA scientist awarded

Dr Natasha Teakle from the Centre for Ecohydrology and School of Plant Biology at UWA, was one of 13 industry winners of the Science and Innovation Awards for Young People in Agriculture, Fisheries and Forestry 2009. She was presented with her award at a formal dinner at Parliament house in Canberra on September 15.

Winners of these awards had to be working or studying in the rural industries and be aged between 18 and 35. Applicants were required to submit a proposal for an innovative project that could be completed within 12 months and addressed a significant issue for Australia's rural industries. Each application was assessed against a range of criteria, including the level of innovation and originality of the proposal, and potential to generate long-term benefits to Australia's rural industries.

Dr Teakle won the Australian Meat Processor Corporation (AMPC) award. AMPC is a National Research and Development Centre, representing all processors active in the red meat processing industry. They support research that will benefit the red meat industry.

Dr Teakle will use her award to study the physiological and genetic traits of legumes that can tolerate marginal soils. The aim of her project is to learn more about how the legume *Melilotus siculus* survives in salty, waterlogged conditions. This will involve collaborations with scientists from the United States using the latest sequencing technology to identify genes controlling salt and waterlogging tolerance in the above pasture species.

"This award will enable me to undertake innovative gene discovery experiments and generate critical scientific networks for the future, to help improve the sustainability of saline land," Dr Teakle said.

Her research will help livestock producers expand into marginal areas and could contribute to the development of new salt-tolerant crop and pasture species.

Dr Kioumars Ghamkhar was awarded the Australian Academy of Science/Japanese Society for promotion of Science Fellowship.

Japanese collaboration and fellowship

Since 2007 the Centre for Legumes in Mediterranean Agriculture (CLIMA), Kazusa DNA Research Institute (KDRI), Department of Agriculture and Food WA (DAFWA), Centre for Comparative Genomics (CCG) at Murdoch University, and CSIRO Plant Industry, Canberra, have teamed up to develop a strategy for clover genomics and its utilisation for future marker assisted breeding. This is an Australian Research Council (ARC) Linkage project co-funded by DAFWA as the industry partner and KDRI as international collaborator.

Dr Kioumars Ghamkhar, CLIMA Research Fellow and the team have constructed linkage maps for two mapping populations. A core collection of subterranean clover world germplasm collection of 10,000 accessions and phenotypes is in its final stages of development. The traits range from simple morphological to important agronomic traits such as flowering time and hardseededness and to biochemical traits such as isoflavonoid content.

Another achievement for the team came in July 2009 when Dr Ghamkhar, nominated by the Australian Academy of Science, was named the winner of a Visiting Fellowship by the Japanese Society for Promotion of Science (JSPS). The Fellowship covers his travel and living costs in Japan for three weeks. During that time he will complete a comparative genomics project between red and subterranean clovers that has already started with Dr Sachiko Isobe and her colleagues in Japan. Dr Ghamkhar will also present the research results and explore potential areas of further collaboration at KDRI, Hokkaido University (Sapporo), National Agricultural Research Centre at Hokkaido (Sapporo), Miyazaki University in Kyushu, and NATCKO in Kumamoto.

"The collaboration with Japan has proved fruitful with the first joint publication in July 2009 and more to come in 2010" Dr Ghamkhar said. "This is an example of how a team of diverse expertise from different institutions can achieve big tasks in shortest timeline." he said.

WAHRI establishing the level of weed seed contamination and the herbicide resistance status of weed seeds.

Are you planting resistant weeds with your crop seed?

WA farmers may still be seeding herbicide resistant weed seed into their cropping paddocks and increasing their weed burden, even after seed cleaning, UWA researchers report.

In a study led by Ms Mechelle Owen, Research Officer WA Herbicide Resistance Initiative (WAHRI) and Dr Pippa Michael of Curtin University of Technology, wheat, barley and canola seed was collected from 78 WA grain growers and examined to establish the level of weed seed contamination and the herbicide resistance status of weed seed.

"Many Australian farmers grow and conserve their own crop seed, which is cleaned on-farm and stored for subsequent crop seeding. This work shows that this crop seed can have weed seed contamination despite cleaning processes being utilised," W/Prof Stephen Powles (Director, WAHRI) said.

Farmers were surveyed to determine if crop seed was cleaned prior to seeding, what cleaning methods were employed and the source of seed used.

"We found that 95% of the farmers surveyed grew their own crop seed and used external cleaners or on-farm cleaning methods. Importantly 74% of the grain samples collected had some level of weed seed contamination, with annual ryegrass and wild radish being the common infesting weed seed. More importantly 26% of the samples were weed free demonstrating it is possible to obtain a clean sample," Ms Owen said.

Ryegrass and wild radish seeds found contaminating the crop seed samples were tested for herbicide resistance. Results confirmed both species were resistant to herbicides commonly used to control them in WA. Consequently many WA farmers are unknowingly introducing weed seed and herbicide resistant weeds into their paddocks.

"With 'farmer saved' seed it is vital to select a weed free paddock when seeding to minimise the collection and subsequent spread of herbicide resistant weeds in the harvest operation," Ms Owen said.

"Adopting sound seed cleaning methods and an integrated weed management strategy, farmers can ensure productivity of their crops for the long term," she said.

Emeritus Professor Jack Loneragan

(7-5-1926 to 11-8-2009)

Emeritus Prof Jenny McComb
J.McComb@murdoch.edu.au

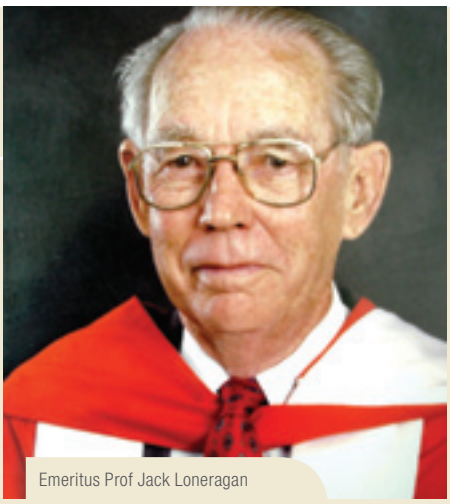
E/Prof Jack Frederick Loneragan was born in Guildford WA. After graduating from Wesley College, he served with the RAAF as radar operator in the latter phase of World War II. His first degree was in Botany at UWA. He received two prizes and was awarded first class honours in 1950. Supported by a Hackett scholarship and later a CSIRO studentship, he went to the University of California, Berkley where his research in plant nutrition earned him a PhD.

On returning to Australia in 1953 he worked as a research officer, subsequently senior research officer, in the Plant Nutrition Section of the Division of Plant Industry in Canberra. In 1961 he returned to Perth as a Senior Lecturer in Soil Science at UWA. He consolidated his reputation as a leader in plant nutrition research and became Reader and Dean of Faculty of Agriculture UWA.

He was one of the foundation Professors of Murdoch University in 1974. He was twice asked to be Dean of the School of Biological and Environmental Sciences (1974-77 and 1981-1984); served terms as chairman of the Board of Research and Postgraduate Studies, chairman of the Academic Staff Promotions Committee, was an elected member of Senate, and first elected chairman of Academic Council and Pro-Vice-Chancellor (Academic). In the last year of his Murdoch service he became Pro-Vice-Chancellor (Research) and Acting Vice-Chancellor.

E/Prof Loneragan was an innovator in the science of plant nutrition and its applications. Amongst others he proposed the concept of functional nutrient requirements, and developed flowing solution culture systems for studying nutrient uptake at realistic external concentrations. His research mainly focused on: nutrition of symbiotic nitrogen fixation by legumes; factors affecting nutrient uptake, particularly micronutrients and cations; nutrient distribution in plants and its relation to phloem mobility; the physiological basis of plant analysis, and; understanding the nature of nutrient interactions.

Later in his research career he turned to nutrition of tropical legumes through and made significant contributions to boron nutrition. His research on nutrient distribution and nutrient mobility are the foundation of modern plant analysis which is used throughout agriculture, forestry and horticulture in Australia to manage crop nutrient supply. His work with Alf Anderson on lime pelleting was the basis for the massive expansion of subterranean clover pastures onto acid soils in southern Australia.



Emeritus Prof Jack Loneragan

Throughout the almost 30 years of his career as an academic Jack guided numerous PhD students and post doctoral fellows in plant nutrition. He was a Member of the International Council of Plant Nutrition, serving as its President 1989-93. Upon retiring he became WA coordinator of the Crawford Fund for International Agricultural Research (1995-2000).

E/Prof Loneragan was one of the first West Australians elected as Fellow of the Australian Academy of Technological Sciences and Engineering (1977). He was also a Fellow of the Australian Institute of Agricultural Science and Technology (1985), President, Royal Society of WA (1981-82), Honorary Doctor of Murdoch University (1989), and appointed member of the Order of Australia (1991). In 1993 Murdoch University named the new Biological Sciences building after him and his wife, Mona.

Iraqi trainees observing salt land in Cunderdin.

Iraqi Trainees at UWA

Ms Georgina Holbeche
(holbeg01@student.uwa.edu.au)

The School of Earth and Environment at UWA recently hosted a " Land Management and Soil Fertility" course for trainees from Iraq, funded by AusAID through Coffey International.

The group of 24 attended a series of specialised lectures, practical sessions, field trips and laboratory visits during their five week stay. The sessions were presented by UWA staff and scientists and managers from government and industry. Participants had the chance to discuss various aspects of land management with experts in the field and forge professional relationships. All the trainees presented their work at a seminar day held at the end of the course.

The trainees were from a variety of scientific backgrounds, many from managerial roles within the Iraqi Ministry of Agriculture. Some work in more remote provinces of Iraq including Babylon, Al Mushraq and Dhi-Qar. Their research interests were diverse and included work with salinity, tomatoes, date palms and irrigation. The group appreciated the field trips; all enjoying the interactive, hands-on nature of the experience.

Staff from the Western Australian College of Agriculture and the Iraqi group discussed the salinity problem in WA, local methods of addressing the problem, parallels to salinity issues in Iraq and how these might be remedied. This group would be able to apply this information in Iraq.

Dr Suresh Pande (ICRISAT) and Dr CLL Gowda (ICRISAT) with W/Prof Alan Robson, Mr Kelly Smith, W/Prof Robyn Owens, W/Prof Kadambot Siddique in the greenhouse-3 at ICRISAT.

UWA Vice-Chancellor visit India

UWA and the International Crops Research Institute for the Semi Arid Tropics (ICRISAT) reinforced their ongoing collaboration in dryland agricultural research during a visit to Patancheru on September 9.

A delegation from UWA led by Vice-Chancellor, W/Prof Alan Robson, also included W/Prof Robyn Owens (recently appointed Deputy Vice-Chancellor Research and Innovation); W/Prof Kadambot Siddique (IOA Director); and Mr Kelly Smith (Director, International Centre). Ties between these two organisations were already strengthened when Dr William Dar (Director General, ICRISAT) and Dr Peter Ninnes (Director, Resource Planning and Marketing (ICRISAT) visited UWA in July as a follow-up to previous interactions. According to ICRISAT they view UWA as university highly regarded in the field of agriculture in Australia and internationally

Stressing the need for strengthening strategic partnerships, ICRISAT Director General, Dr William Dar said that the challenge of feeding the poor in developing countries is big and called for greater cooperation towards a solution. "We will be working on a new work plan for the coming two to five years so that ICRISAT and UWA can generate fundamental work for the people of Asia and sub-Saharan Africa," he added. In appreciation of the collaboration between the two institutions, he presented a certificate of recognition to W/Prof Alan Robson.

W/Prof Robson stated that Australia, with vast tracts of semi-arid land mass, would encourage its Asian and African students to work closely with ICRISAT, which has extensive knowledge in this field. "We at UWA have decided to give more scholarships for students willing to work on Africa based research projects," he said. W/Prof Robson also said that UWA stood seventh in the publication of scientific papers this year in the field of plant/ crop sciences.

UWA has an ongoing five-year breeding program in ICRISAT for *Ascochyta blight* resistant chickpea and salinity tolerance research. This was recently extended for three more years.

UWA will encourage exchange of students for research at ICRISAT. Offering increased financial assistance to Indian students, W/Prof Robyn Owens announced fifty research scholarships for students wishing to pursue research in various fields at UWA, and a grant of Australian $25,000 per year for students who will undertake research under joint supervision of ICRISAT and UWA.

The delegation visited the Genetic Transformation laboratory and saw keen interest in the ongoing research there and also in the new facility being constructed for translational research on transgenic crops. They visited the RS Paroda genebank, and green house-3, which houses UWA and ICRISAT's work on desi chickpea and demonstration plots of pigeonpea, sorghum, groundnut and pearl millet.

Prof Alex Gardner.

Water resources law – sharing water scarcity

Professor Alex Gardner (alex.gardner@uwa.edu.au)

Agriculture is the largest user of water resources in Australia, but its share of water use is now falling. The 2000 water resources assessment showed that (for 1996/97) irrigated agriculture accounted nationally for approximately 75% of water usage, compared to about 40% in WA. Rural (stock and domestic water supplied from farm dams) took up about 5.5% of water use nationally, again a little less in WA. There was a 65% increase in Australian water use between 1983/84, mostly due to increased irrigation for agriculture.

The 2005 assessment shows that total national water use fell from 2000-01. Total agricultural water use fell as a proportion of national water use. Nationally, total usage fell from 21,703 gigalitres in 2000-01 to 18,767 gigalitres in 2004-05. By 2005, total agricultural water use as a proportion of total use fell to ± 65% nationally and to 36% for WA. About 91% of these amounts comes from irrigated agriculture; the remainder is for stock drinking water and cleaning of animal facilities. The biggest reductions in water use were in rice and cotton irrigation, due to reduced water availability. These falls in usage are likely continuing, as the effects of continued drought and climate change affect both surface water and ground water.

This decline in water availability in the most populated areas was reflected in a sustained 15 years program of water resources law reform. The reform is guided by the twin themes of establishing statutory water resources planning to secure environmental sustainability and moving to a new water access rights regime centred on 'water access entitlements' that are tradable in regulated water markets. The resultant state and territory legislation is the product of the most significant reforms since Australian water statutes were first enacted. The Commonwealth Parliament has entered the field of water resource management and, with the support of some state-referred legislative powers, has passed a framework for the national oversight of water resources management in the Murray-Darling basin in addition to other provisions with nationwide operation.

The effect of this reform is analysed in a new book. Prof Alex Gardner, and W/Prof Richard Bartlett from the UWA and Ms Janice Gray from the University of New South Wales, have completed a five-year project to produce a treatise on Water Resources Law, published in July. This book is an invaluable resource for practitioners, academics, environmentalists and students, and written to be accessible to lawyer and non-lawyer alike. This book traces the legal history and policy development of water resources law and reforms. It explains how the new water resources legislation seeks to implement the national reform policies. The book has six main parts, including Australian water resources and water access policy, the nature of water access rights, water resources planning, and water trading.

E/Prof André Lauchli and Dr Natasha Teakle

What makes plants waterlogging resistant?

Mrs Erika von Kaschke (Erika.vonKaschke@uwa.edu.au)

"Which characteristics make some plants more waterlogging resistant" is one of the questions Swiss-born plant biologist, Emeritus Prof André Lauchli, hopes to get an answer to during his visit to UWA.

E/Prof Lauchli has joined forces with A/Prof Ed Barrett-Lennard, Prof Tim Colmer (School of Plant Biology) and Dr Natasha Teakle (School of Plant Biology and Centre for Ecohydrology) to look for waterlogging and salinity solutions.

E/Prof Lauchli has a brilliant track record. He joined the University of California Davis in 1978. This is his third visit to UWA in the last five years.

Although semi-retired, this distinguished Professor works on Environmental Plant Physiology. He is looking at how crops react when you combine salinity and toxic trace elements in the soil like high boron content. He is specifically looking at interactions between salinity and other environmental constraints.

"In Central California we have similar environmental constraints to WA. Farmers can only grow summer crops by irrigation. Saline areas occur because of over irrigation. Now waterlogging is also becoming a problem," he said.

E/Prof Lauchli and Dr Teakle are doing experiments on Puccinellia (*Puccinellia ciliata*) and tall wheat grass (*Thinopyrum ponticum*). Puccinellia is a native perennial grass that is highly salt- and waterlogging tolerant. Tall wheat grass is less tolerant to both these stresses. For some plants waterlogging makes the effects of salinity worse. Growing both *Puccinellia ciliata* and tall wheat grass side by side under both salinity and waterlogging conditions one should see a big difference in growth.

E/Prof Lauchli says that the reason Puccinellia may be able to resist waterlogging and salinity is because of its ability to maintain the uptake of potassium. "Tall wheatgrass loses potassium quickly. Others have found that when potassium drops to a very low level, the inhibition of growth due to salinity and waterlogging could be worsened," he said.

"We are trying to discover which mechanisms Puccinellia posses that make it survive. We believe that it lies mainly in the roots. Hopefully some of these processes get passed on to the next generation," E/Prof Lauchli added.

Alumni

Dr Pippa Michael

Research Fellow

School of Agriculture and Environment, Curtin University of Technology, Northam WA

Dr Pippa Michael completed her Bachelor of Agricultural Science (Hons) in 2001. She received her PhD on the "Agro-ecology of small-flowered mallow" in 2006 (GRDC funded project) from UWA. Dr Michael then began working as a field biologist with Syngenta Crop Protection for a year before taking up her current position as a Research Fellow at Curtin University, based in Northam at the Muresk campus. Her current area of research remains within the agricultural weed ecology field. She is involved in several collaborative projects including weed seed grain contamination and their herbicide resistant status (with WAHRI, UWA), determining emerging weeds in WA agricultural systems through field and farmer surveys (with DAFWA) and spatial dormancy patterns in annual ryegrass (with WAHRI).

Dr Sallie James

Trade Policy Analyst
Center for Trade Policy Studies, Cato Institute, Washington, DC

Dr Sallie James completed her Doctor of Philosophy through the School of Agricultural and Resource Economics (SARE) at UWA in 2003. Her dissertation, on consumers' attitudes towards genetically modified food, was supported by an ARC-SPIRT grant (in conjunction with the WA Department of Agriculture). She then worked at the Australian Government DAFF for a year before moving to the Department of Foreign Affairs and Trade. Since 2006 she has been a trade policy analyst at the Cato Institute, a think-tank in Washington, DC. Her research focuses on many aspects of US and international trade policy, including agricultural trade policy and the trade policy implications of climate change regulations. She has very fond memories of her time at UWA and retains a special place in her heart for SARE.

Mr Dave Wreford

Winnipeg, Manitoba, Canada

Mr Dave Wreford graduated BSc(Agric) from UWA in 1966. His first job, based in Toronto, Canada, was with the Southam Corporation as a field writer for their farm publications. He was subsequently transferred to Winnipeg. Later he worked for United Grain Growers (UGG) Ltd, a grain company with interests in the agriculture publishing field.

In 1974, after another stint in Toronto, UGG returned him to Winnipeg as editor of Canada's national English-language monthly farm magazine. He held that position for 31 years until retirement in 2005. Mr Wreford continues to do contract work for his former employer and other organizations as well.

Mr Wreford's recollections of UWA, and St. George's College where he lived as a student, are unreservedly fond. The excellent theoretical knowledge imparted by various Professors in different segments of the biological sciences made for an easy transition to his chosen field in North America. His advice to today's undergraduates: "it's a great big wonderful world out there, prepare to enjoy it, and don't be limited by geographic or cultural boundaries," he said.

Dr PR Bird OAM

Senior Research Scientist Department of Primary Industries, Victoria

Dr Rod Bird OAM completed his BSc (Agric) (Hons) at UWA (1967). In 1972 he obtained his PhD and acted as a Senior Demonstrator in the Department of Animal Science. He joined the Department of Agriculture in Victoria in 1973. First he worked on the impact of stocking rates of steers on seasonal pasture growth and utilisation, pasture intake, grazing times, steer liveweight changes and body composition, but in 1982 he began agroforestry research with pine and sheep. The project ran for 25 years and showed how various designs affected animal and forestry outputs.

Later he engaged in farm forestry projects on over a hundred farms in south western Victoria. Dr Bird OAM has authored two books, published 170 research papers and 90 extension papers. He retired in October 2007.

"In my first year at UWA a lecturer in a Physics 'prac' period reminded us that 'in Agriculture one must also plot the data'. The background in science subjects in Agricultural Science, and the steely disciplines learned from postgraduate research, enabled me to transfer easily from animal nutrition into forestry research. A background of Agricultural Science also gives one a broad perspective when moving into a new field of research or industry," he reflected. Dr Bird was awarded an Order of Australia Medal in the Queen's Birthday Honours list in June 2009 "for service to the environment through farm forestry and revegetation programs".

New staff

Ms Belinda Pope

Ms Belinda Pope was appointed as Science Education Officer with PICSE (Primary Industry Center for Science Education) within the Faculty of Natural and Agricultural Sciences (FNAS) at UWA. She has a Bachelor of Education from Edith Cowan University. Over the last five years Ms Pope taught in Perth and in Canada. With this experience and a passion for education and science to motivate and inspire youth, it has enabled her to provide students, teachers and schools with engaging, interactive and innovative science activities through the PICSE program. Ms Pope works with students and their teachers to successfully achieve outcomes related to the curriculum, through enjoyment and achievements in their work with the Science Investigation Awards and other activities that PICSE run on a national scale.

Email: belinda.pope@uwa.edu.au

Dr Helen Bramley

Dr Helen Bramley joined IOA as a Research Associate in October. She will work on the physiology of cereals and other crops in response to climate change with W/Prof Kadambot Siddique. Dr Bramley, an external student of UWA, was awarded her PhD with distinction in Plant Physiology in 2006. Since then she worked as a Postdoctoral Fellow at the Universities of Adelaide (Australia) and Alberta (Canada). Her research has focused on plant hydraulics from single cells to whole plants, using algae, and crop and tree species. She is interested in how water transport through the plant is influenced by the environment. With the prospect of more drought, higher temperatures and elevated CO2 due to climate change, Dr Bramley believes that understanding how these conditions affect crop growth and water relations, is important for sustainable crop production.

Email: helen.bramley@uwa.edu.au

Dr Lori Lach

Dr Lori Lach is a Research Assistant Professor in the School of Plant Biology. She is working with Prof Richard Hobbs to investigate the effects of ecosystem change and restoration on pollination. Dr. Lach earned her PhD from Cornell University in NY, USA in 2004 and was awarded a US National Science Foundation International Research Fellowship to investigate the effects of invasive ants on plant restoration in Mauritius. She moved to Murdoch University in 2005 to work on an ARC-funded project investigating the roles of invasive ants in urban bushlands around Perth. Her most recent major project is an edited book, Ant Ecology, published by Oxford University Press and due out in December 2009. Her research interests include biological invasions, restoration ecology, and insect-plant interactions.

Email: lorilach@cyllene.uwa.edu.au

Ms Neree Martinez

Ms Neree Martinez, Extension Agronomist, at WA Herbicide Resistance Initiative (WAHRI) comes from a mixed cereal and livestock farming enterprise at Mullewa. She graduated in 2003 with Honours in the Bachelor of Agricultural Science degree from UWA. She then spent one year in rural editing at the Kondinin Group before joining Elders as an Agronomist first at Wagin and then Northam. At Elders she interacted with a range of farmer clients on a daily basis, handling crop nutrition/fertilizer advice, paddock and crop rotation planning as well as pest control options in cropping. In 2008 Neree took a sabbatical year from Elders and worked in a human resources role based in Perth before returning to Elders as an agronomist servicing the Williams/Wagin area in 2009. She started working at WAHRI in September 2009 and will be responsible for the WAHRI outreach program, interacting with agronomists, farmers and others in the cropping industry as well as conducting applied crops/weeds research. Neree is looking forward to increasing two-way communication between WAHRI and the grains industry.

Email: neree@cyllene.uwa.edu.au

Professor Martin Fey

Prof Martin Fey has worked as an academic (teaching, research and consulting) at the Universities of Natal, Cape Town and Stellenbosch in South Africa. He has spent extended periods of research leave at the Universities in the USA (Georgia and Texas A&M). He moved to UWA at the beginning of 2009, as Professorial Fellow in mineral processing waste, a position funded jointly by Alcoa World Alumina Australia and BHP Billiton Worsley Alumina (Pty) Ltd. Professor Fey's research interests and expertise include: bauxite – its genesis, mineralogy and exploration; rehabilitation and re-use of bauxite processing residues and other industrial and mining wastes; soil genesis and classification; fertilizer and lime requirements of crops and pastures; impacts of soil salinity, mining and acid sulfate weathering on the quality of water; and the role of soils in ecosystem management and restoration. Professor Fey is currently finalizing a new book (on the Soils of South Africa.

Email: martin.fey@uwa.edu.au

Dr Ram Pandit

Dr Ram Pandit hails from Nepal. After his undergraduate degree in Forestry Science at the Institute of Forestry in Nepal (1994), Dr Ram worked in a research center, Lumle Agricultural Research Center, as Agroecological Research Site Coordinator. He coordinated agricultural, forestry, and socio-economic research activities in field stations and interacted with farmers. From July 1998, he was forester (Nepalese Government) and developed, implemented, and monitored community and national forestry programs. In 2001 July, he joined State University of New York, College of Environmental Science and Forestry under the Fulbright program and completed his MS in Forest Resources Management in 2003. Immediately after, he joined Applied Economics PhD program at Auburn University which he completed in 2007. Dr Pandit worked as a post-doctoral fellow at Auburn University until June 2009, and was involved in ecosystem service valuation and ground water related research activities. Dr Pandit joined UWA as Assistant Professor at the School of Agricultural and Resource Economics (SARE) in June 2009. He co-teaches courses in Environmental and Resource Economics and Project and Risk Management in the School.

Email: ram.pandit@uwa.edu.au

New PhD students

NAME	TOPIC	SCHOOL	SUPERVISOR(S)	FUNDING BODY
Mr Cesar Rosales	Nutrition-reproduction interactions in sheep and goats	Animal Biology	W/Prof Graeme Martin	CONACYT (The Mexican National Council for Science and Technology).
Ms Xi Xi Li	Antimethanogenic bioactivity of Australian plants'	Animal Biology	Assoc/Prof Phil Vercoe, Res/Asst /Prof Shimin Liu	UWA-China Scholarship and FFI CRC
Ms Xintian (Cynthia) Ge	Management of the downy mildew pathogen *Hyaloperonospora parasitica* through development of durable host resistance to races of the pathogen occurring in Southern Australia	Plant Biology	Prof Martin Barbetti, Res/Asst/Prof Hua Li, W/Prof Krishnapillai Sivasithamparam	SIRF, University International Stipend, SIRF top up
Ms Jessie Moniodis	Elucidation of genetic and physiological factors controlling sesquitopore production in Sandalwood	Plant Biology	Dr Chris Jones, Prof Julie Plummer, Assoc/Prof Emilio Ghisalberti, Dr Liz Barbour	ARC Australian Postgraduate Award (Industry)
Ms Budiastuti (Tuti) Kurniasih	Rice coleoptiles	Plant Biology	Prof Tim Colmer	Indonesian Govt Scholarship

New research projects

TITLE	FUNDING PERIOD	FUNDING BODY	SUPERVISOR(S)
Conference sponsorship application: Exploiting genome-wide association in oilseed brassicas: A model for genetic improvement of major OECD crops for sustainable future farming.	2009	Grains Research and Development Corporation (GRDC)	Prof Wallace Cowling and Prof Willie Erskine
Travel grant: Fourteenth Australasian Plant Breeding Conference	2009	Grains Research and Development Corporation (GRDC)	Res/Assist/Prof Jon Clements
Generation of genetically modified herbicide tolerant narrow leaf lupin	2009-2013	Grains Research and Development Corporation (GRDC)	Prof Willie Erskine, Assoc/Prof Susan Barker and W/Prof Kadambot Siddique
Interspecific hybrids in lupins- stabilisation and trait transfer to fixed lines for lupin crop improvement	2009-2011	Grains Research and Development Corporation (GRDC)	Res/Assist/Prof Jon Clements
Agricultural benefits of green manuring leaf biomass from Bioenergy crops	2009-2012	Rural Industries Research and Development Corporation (RIRDC)	Dr Robert Sudmeyer and Dr Neil Coles
Feed efficiency maternal productivity and responsible resource use	2007-2010	WA Department of Agriculture and Food Ex Beef CRC	Assoc/Prof Dominique Blache
Predicting ethical consumers intentions to purchase wool apparel and their willingness to pay for ethical attributes	2010	UWA Research Development Award Scheme	Assist/Prof Joanne Sneddon
Sexual conflict in honey bees- the molecular response of queens to seminal fluid	2010	UWA Research Development Award Scheme	Dr Veronica Poland
Pasture soil amelioration with chicken litter	2009-2010	BHP Billiton Worsley Alumina	Prof Mark Tibbett

Research and industry recognition

NAME	AWARD
Dr Natasha Teakle	Australian Meat Processor Corporation (AMPC) award at the Science and Innovation Awards for Young People in Agriculture, Fisheries and Forestry 2009
W/Prof David Pannell **Res/Assist/Prof Sally Marsh**	The Australian Research Council Eureka Prize for Excellence in Research by an Interdisciplinary Team
Dr Penny Hawken	EHB Lefroy Fellowship
W/Prof Graeme Martin	UWA Representative on the National Steering Committee of the reducing emissions from livestock research program, a national program of R&D funded jointly by Meat & Livestock Australia (MLA) and the Commonwealth Department of Agriculture, Fisheries & Forestry (DAFF).
Dr Kioumars Ghamkhar	Visiting fellowship by the Japanese Society for Promotion of Science (JSPS)
W/Prof Kadambot Siddique	Guest Professor of Gunagzhou University

Visitors to the IOA

NAME	VISITOR ORGANISATION AND COUNTRY	HOST	DATES
Prof Ahmad Shukri Mustapa Kamal Prof Dr. Abdul Aziz Baba Prof. Nor Azazi Zakaria Ms Noor Aaini Ismail	Universiti Sains Malaysia (USM)	W/Prof Tony O'Donnell	19 October
Dr Pooran Gaur Dr Vincent Vadez	ICRISAT, India	W/Prof Kadambot Siddique Prof Tim Colmer	22 October
Mr Frank Thompson	AusAID Canberra	Mr Kelly Smith	23 October
Prof Sujin Jinayon Dr Kanchana Ngourungsi	Naresuan University, Thailand	W/Prof Tony O'Donnell	26-28 October
Hon Helen Morton MLC	Parliamentary Secretary representing Treasurer, Minister for Commerce; Science and Innovation; Housing and Works; and Minister for Water; Mental Health	W/Prof Tony O'Donnell	27 October
Mr Alan Hill	WA Farmers Federation	W/Prof Kadambot Siddique	29 October
Mr Lloyd Milliner Mr Kedir Tessi Ms Robyn Grieve	Asella Model Agricultural Enterprise, Ethiopia	W/Prof Kadambot Siddique	18 November
Professor Rakesh Kashyap	Harayana Agricultural University, Hisar, India	W/Prof Kadambot Siddique	30 November
Prof Wang	International Collaboration and Exchanges, Lanzhou University	W/Prof Graeme Martin	1 December
Prof Glen Denning	Centre for Globalisation and Sustainable Development at the Earth Institute, Columbia University, USA	W/Prof Kadambot Siddique	4 December
Prof John Rodger	Tom Farrell Institute for the Environment, University of Newcastle	W/Prof Graeme Martin	8 December
Prof Fred Allendorf	University of Montana	W/Prof Graeme Martin	9 December
Prof Louw Hoffman	University of Stellenbosch, South Africa	W/Prof Kadambot Siddique Assoc/Prof Irek Malecki	16 March 2010

UPCOMING MEETINGS AND EVENTS

IOA EVENTS

Hector and Andrew Stewart Memorial Lecture
Professor Louw Hoffman, University of Stellenbosch, South Africa
16 March 2010
www.ioa.uwa.edu.au

Stay up to date with the latest UWA Institue of Agriculture events: www.ioa.uwa.edu.au

NATIONAL AND INTERNATIONAL EVENTS

AGRIBUSINESS Crop Updates
Thurs 25-Fri 26 February 2010, Burswood
Tel: 6272 4567,
Email: admin@agvivo.com.au
www.agric.wa.gov.au

WANTFA Annual Conference
10 March 2010, TBA
Email: kaye@wantfa.com.au
www.wantfa.com.au

Australian Summer Grains Conference 2010
21-24 June 2010, Gold Coast, Qld
www.australiansummergrains.com.au

5th International Food Legume Research Conference and 7th European Grain Legume Conference
26-31 April 2010, Anatalya, Turkey
www.iflrc-ecgl.org

Publications (August – December 2009)

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CONTACT DETAILS

If you wish to be included on the mailing list or receive this publication by email or hard copy please contact us.

Editor: Erika von Kaschke
Erika.vonKaschke@uwa.edu.au
Institute of Agriculture
Tel: +61 8 6488 4717
Web: www.ioa.uwa.edu.au
The University of Western Australia
M082, 35 Stirling Highway
Crawley, WA 6009

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