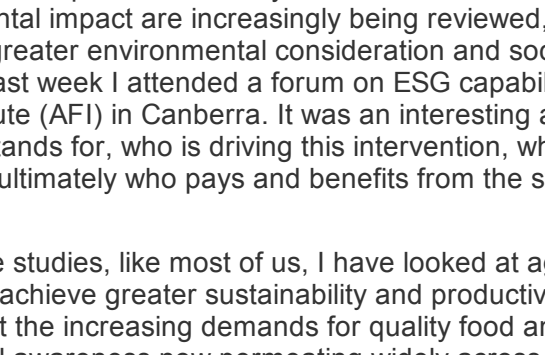


Canola fields at Nowley Farm
Edition 10, October 2022



Georgika - an online newsletter for those interested in academic aspects of the Ag sector

From the Director

Brent Kalsar

Welcome to the October issue of Georgika.

We hope you can attend our upcoming events in November (outlined below). After two years of running events online, we are pleased to welcome you back on campus to hear informative talks, network and engage with our researchers and students.

ESG or Environmental, Social, and Governance standards are relatively new forms of corporate metrics, created to guide corporate behaviour towards socially conscious community investment and appreciation. Agriculture, and in general the greater food and fibre production life cycle, is a sector where sustainability and environmental impact are increasingly being reviewed, challenged, and called upon to improve productivity with greater environmental consideration and social benefit, and governance for the greater community. Last week I attended a forum on ESG capabilities in agriculture promoted by the Australian Farm Institute (AFI) in Canberra. It was an interesting and informative listen about the mysteries of what ESG stands for, who is driving this intervention, what mechanisms are in place to coordinate its roll-out and ultimately who pays and benefits from the standardisation and data-collection exercise.

Since beginning my graduate studies, like most of us, I have looked at agriculture through a lens of opportunities that attempt to achieve greater sustainability and productivity, interdependent processes necessary to meet the increasing demands for quality food and fibre by all societies. It's refreshing to see this general awareness now permeating widely across the general community and, in doing so, recognise the significant scientific challenges we still face in achieving increased sustainability and social progressiveness to an industrial sector so essential to life on this planet. Things to note from the AFI meeting were the general enthusiasm for launching ESG audits (clearly a boutique industry ready to launch); the lack of frameworks to harmonise and utilise the data in a productive and respectful way; the overriding requirement of farmers to carry much of the responsibility with often undefined benefit or incentives; and the limited discussion or consideration on what sustainability actually means, or what level of sustainability needs to be achieved to address real outcomes. I believe we are on a journey that has just begun, but that will be reliant upon significant input from the research community to define the types of variables that need to be measured, how the data is interpreted and integrated into decision models, and ultimately the required shifts in production that seek lasting sustainable and social goodwill outcomes that secures agriculture as a cornerstone of a healthy and progressive society. If ESG credentials are key to new and continuing investment, then surely the same financial controllers will recognise the need for expanded investment in the basic sciences and social policy areas of agriculture that underpin the quality of any ESG credit or assigned label.

After two years online, this Sydney Institute of Agriculture welcomes your attendance at our Research Showcase. This year we highlight the new frontiers in Urban Agriculture and research on social, economic and health benefits of Urban Agriculture.

This year's Urban Agriculture Showcase coincides with both Urban Agriculture Month – *Growing Edible Towns and Cities* and our National Agriculture Day – *Celebrating Innovation in Agriculture*. The event brings together University of Sydney and CSIRO researchers, and urban farmers to showcase their amazing innovations that are growing fresh produce in our cities across the globe. Our speakers will showcase high tech urban farms, community garden uses, kerbside edible gardens, entrepreneurship, urban farming systems, and much, much more. Our wonderful caterers will also be serving up some produce grown by our local vertical farms, Greenspace and Inverto, and prepared and served together with our local FoodLab entrepreneurs.

Although there is no charge to attend this event, registration is essential.

[Register to attend the Research Showcase](#)

Events

Research Showcase - Urban Agriculture

Date: Friday 18 November 2022
Time: 9am to 3.30pm
Venue: Veterinary Science Conference Centre, University of Sydney

After two years online, this Sydney Institute of Agriculture welcomes your attendance at our Research Showcase. This year we highlight the new frontiers in Urban Agriculture and research on social, economic and health benefits of Urban Agriculture.

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[Register to attend the Research Showcase](#)

Future-Proofing AIP Protein: a R&D Deep Dive

Date: Tuesday 15 November 2022

Time: 9am to 5pm, followed by networking drinks

Venue: The Rectory, University of Sydney

Topics for discussion include:

- * the alt protein industry's R&D capabilities, the value of collaborations and what we can expect to see from research providers in the future
 - * representatives from alternate protein manufacturers will share their experiences
 - * roadmap to Australia's regulatory environment for novel foods
 - * growth opportunities locally and abroad, with a particular focus on regional NSW and the Asian market
- This event provides an opportunity for the industry to make valuable connections and gain a deeper understanding of the nuances of the R&D landscape in Australia.

[View the program and purchase tickets](#)

The Royal Society of NSW Poggendorff Lecture 2021

A plant breeder's perspective on food security and climate change

Date: Wednesday 30 November 2022

Time: 4.00 to 6.00pm

Venue: Auditorium, Michael Spence Building (Administration Building), University of Sydney

The Poggendorff Lectureship is awarded periodically for research in plant biology and/or more broadly agricultural science. The

2021 Lectureship was awarded to Professor Richard

Threthowan, SIA's Theme Leader for Plant Breeding and Production.

Richard's lecture is titled *A plant breeder's perspective on food security and climate change*.

Although there is no charge to attend this event, registration is essential.

[Register to attend the Poggendorff Lecture](#)

Theme Leader Updates

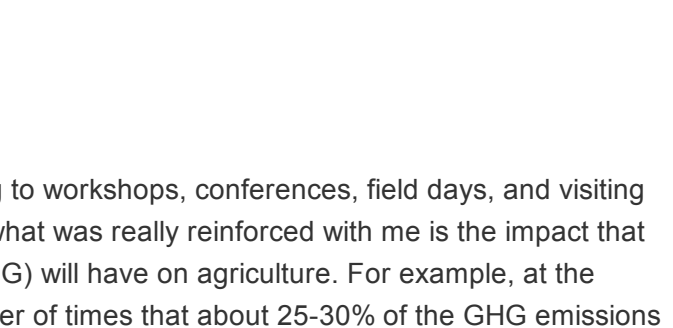
Plant Breeding and Production

Richard Threthowan

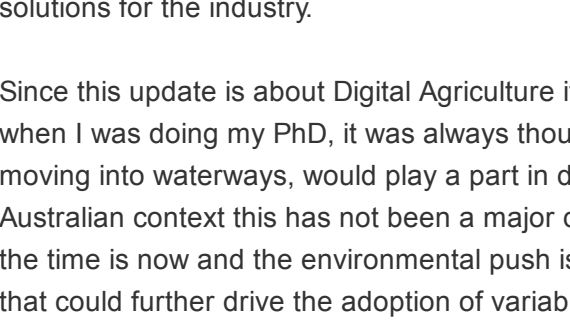
The Narrabri Field Day was held on Wednesday 14 September. The weather was perfect, all crops looked amazing, and attendees were happy to be back on the ground after two years online. Over 250 people attended the Field Day, including exhibitors, researchers and local farmers.



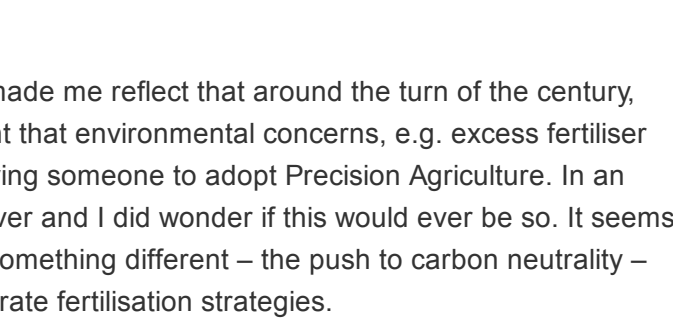
Launch of Lindsay Obrien's book: The first 60 Years.
The history of Australia's first grower initiated and owned wheat research institute



Richard Threthowan; CAIGE program (wheat)



Wheat varieties



Presentations in the field

SIA was delighted to take an amazing group of 20 HDR students on a tour of regional NSW from 13 to 15 September. Hosted by SIA Theme Leader Tom Roberts, we set off for three jam-packed days of learning and new experiences.

Our first stop was the University's **Nowley Farm** at Spring Ridge. Amanda Nash told us about their wheat, canola, barley and cotton crops plus 350 head of cattle situated on the 2083 hectare property. It was calving season so we saw many new additions in the paddock and we were all impressed by the gorgeous yellow of the canola fields!

The following morning we visited the **Australian Cotton Research Institute** (ACRI) near Narrabri. ACRi's research activities assist the cotton industry to develop a sustainable future. We saw various stages of cotton including the seeds, glasshouses, labs, cotton gin, controlled growth rooms, soil compaction studies and the insectaries.

During the afternoon we attended the Narrabri Field Day. Our students saw first hand all the amazing research conducted on site and learnt some of the strategies our scientists are using to better position the grains industries to manage increased stability due to changing climate and global markets. We saw how new genetics in traditional crops, new crops and different crop management strategies are leading the way.

We learnt about wheat, canola, faba beans, chickpeas, mustard, barley, native grains, digital ag ad hybrid wheat. Everyone enjoyed the plant based burger BBQ lunch and the pancakes made with native milk. See group photo in the above section about the Narrabri Field Day.

On the final day we walked through the forest area of Llara Farm, Narrabri with **Kerrie Saunders** to discover the native grains and foods. Kerrie explained the many uses of the plants, not just for food but to make tools. Our final stop on the way home was Hunter Belle Cheese where we saw Jersey butter being made and taste tested some of their cheese.

We haven't run our HDR tour since 2019, so this was a wonderful opportunity for HDR students to form new friendships and connections, and learn about the many areas of agricultural research conducted at the University and around NSW.

[Read further about Plant Breeding and Production](#)

Digital Agriculture

Tom Bishop

Over the past few months I have been travelling to workshops, conferences, field days, and visiting with grower groups. I have learnt so much but what was really reinforced with me is the impact that the reduction in greenhouse gas emissions (GHG) will have on agriculture. For example, at the Cotton Australia Conference I came up a number of times that about 25-30% of the GHG emissions on a cotton farm came from nitrogen fertiliser applications which includes the production, transport and application of the fertiliser. As individual farmers or whole industries seek to become carbon neutral this is a big lever to pull. It won't be the only lever, but it will be part of mosaic of levers or solutions for the industry.

Since this update is about Digital Agriculture it made me reflect that around the turn of the century, when I was doing my PhD, it was always thought that environmental concerns, e.g. excess fertiliser moving into waterways, would play a part in driving someone to adopt Precision Agriculture. In an Australian context this has not been a major driver and I did wonder if this would ever be so. It seems the time is now and the environmental push is something different – the push to carbon neutrality – that could further drive the adoption of variable-rate fertilisation strategies.

Part of this is the need to know your soil at high spatial detail, and I highlight 2 projects in this update. One that has just been funded and the other is a proof-of-concept out of the Digital Sciences Initiative.

Mapping of soil in 3D

In 2019 GRDC funded a range of projects in machine learning from soil to plants to text analytics. The idea was to do a proof-of-concept to see what was possible. **Associate Professor Brett Whelan** as lead CI was successful in winning one of these to explore machine learning for mapping soil in 3D, with a focus on soil constraints such as sodicity. It developed a novel approach to accounting for the depth of the soil sampling, and then at the prediction stage allows us to predict for any depth and over different horizontal areas such as small blocks, zones or whole-paddock.

GRDC has now funded an extension of this project to test on farms across Australia and work with a commercial partner, Precision Cropping Technology to translate these to deploy on their commercial platform. The geographic coverage of the project means that it will raise the profile of Agriculture at the University of Sydney nationally. A recent media release from the GRDC about the project can be found [here](#).

Sensing available nutrients in soil

The science around field sensing of certain soil properties such as carbon and texture is quite developed but a missing piece is measuring available nutrients. Once we have a sensing system we then need to deploy it on a platform for collecting and processing the soil. Ideally this would be autonomous. This problem has been the focus of the Digital Sciences Initiative Digital Agriculture Theme. A team led by Professor Salah Sukkarieth have prototyped a system to autonomously sample soil and process it for delivery to a soil sensor. For anyone that has sampled soil this is a big win. The end goal is planned to be an autonomous system for sampling, sensing and mapping of soil nutrients. The team is now looking for external funding to develop this further.

Summary

Bringing this all back to variable-rate fertilisation, the first project gives an approach to map soil in 3D which can be used to estimate the soil bucket size to inform potential yield targets, which leads to decisions about nutrient targets. The second project measures the nutrients in the soil so we have a better estimate of the fertiliser rate that is needed to reach our nutrient targets. Key to both is a spatial estimate of soil which is needed for variable-rate fertilisation, which is one of the levers we can pull to move towards carbon neutrality in agriculture in the coming decade.

[Read further about Digital Agriculture](#)

Animal Agriculture

Cameron Clark

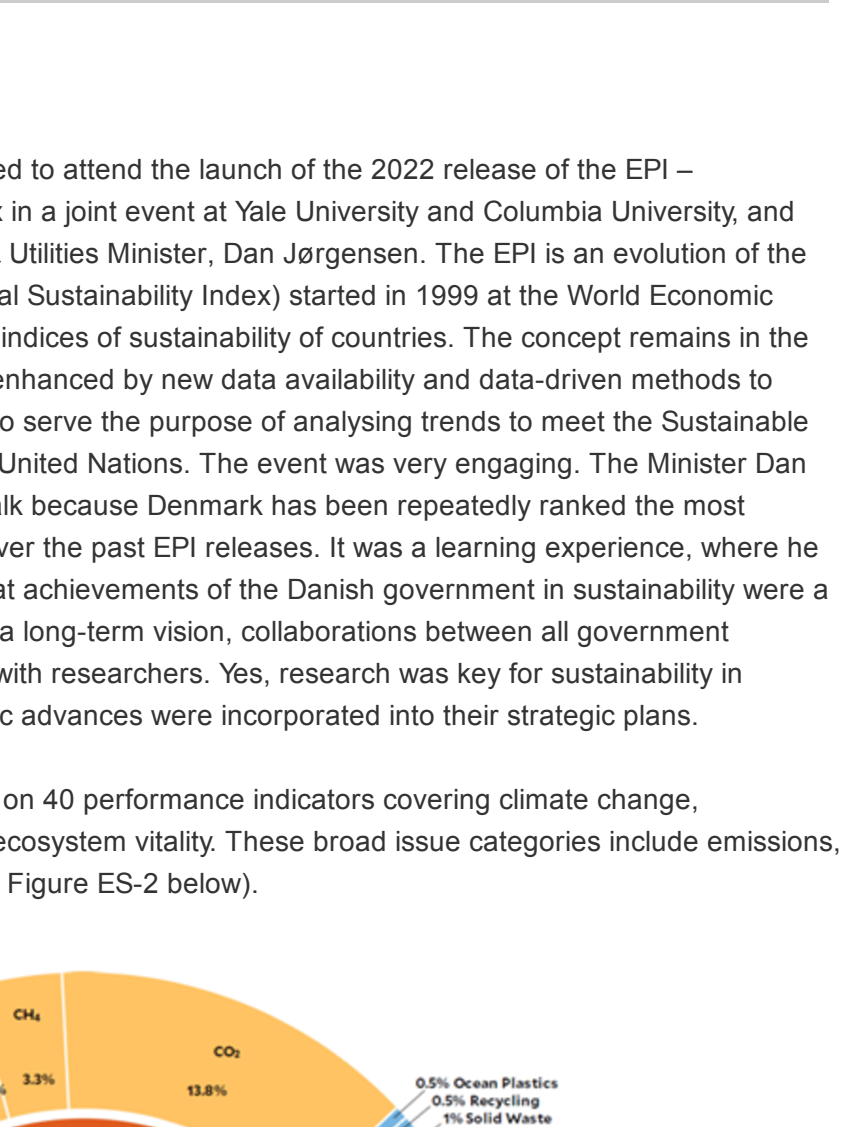
It was the Australian dairy industry that provided the scholarship and support for my entry into the world of agriculture and science. As I had (and still have) a passion for both agronomy and the animal, what better way to combine both than the dairy system. My PhD was heavily focused on dairy cattle physiology, specifically the response of our dairy cattle to negative energy balance in early lactation and the associated ramifications to reproductive performance. Non-esterified fatty acids, ketone bodies were each a focus, as was the variability in individual animal energy balance as we attempted to piece together the differences in animal response. Since this time, the Australian Dairy Industry has taken up numerous technologies to monitor the individual animal and with this, created a wonderful dataset. Recent advances in data science are now enabling significant advances as to our understanding of the individual animal and with this, the diversity in our herd in response to the environment – a big shift from my earlier work... This data driven approach is now helping our farmers rapidly expand and better understand diversity and it is this approach that forms one of the pillars of our recently funded **DairyUP** programme led by **Prof Yani Garcia**. Whilst solving key industry challenges this programme has enabled us to reinvigorate our dairy research capacity with Dr Anna Chingaryan and **Dr Martin Correa-Luna** recently joining the team. This DairyUP initiative coalesces all facets of the NSW dairy industry into one programme.

DairyUP – Prof Yani Garcia

DairyUP is the new collaborative R&D program led by the University of Sydney's Dairy Research Foundation and delivered together by the University, Sobus, Dairy Australia and NSW DPI. The \$16m, 5-year program is designed to help the recovery of the NSW dairy industry by unlocking the potential of milk, cow and water. We have just completed the first year of five, with key achievements for 2021/22 summarised below.

Altogether we have 22 projects/subprojects underway!

Many new PhD students and staff and over 50 people directly or indirectly working or collaborating in DairyUP. There are some great early science-based insights and publications from P2 in relation to cow longevity and a couple of shorter projects close to completion and with very interesting outputs! If you want to know more or receive our e-news please visit www.dairyup.com.au or contact myself or **Cameron Clark**.



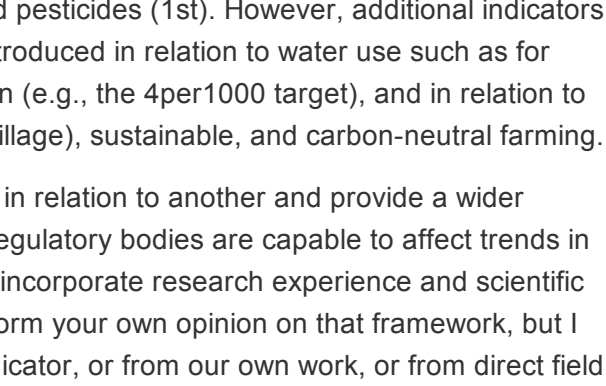
[Read further about Animal Agriculture](#)

Urban Agriculture

Floris Van Ogtrop

I recently met with Michael, Peter, and Joek from **St. Helen's community garden in Gluebe**. It was great to have a chat about the gardens and some of the challenges they face. All were clear that they thought that this community garden worked well. They have generally avoided the internal conflicts that sometimes arise in community organisations due to differences of opinion. The key is plot governance, as opposed to assigning plots to individuals. Another challenge we discussed is compost management. Food scraps (the greens) are plentiful, and in fact they often turn away food scraps as there is too much for the 8-10 compost bins and 12 worm farms and the volunteer members to manage. Further, the nitrogen rich food scraps need to be balanced by a carbon source such as straw (the browns) which is often purchased from a local supplier. It certainly shows that while there is a will to contribute to compost in the community, there is not enough capacity – both in terms of demand for the composted material and the volunteer labour to process it. It will be interesting to see whether more city councils start to implement FOGO (Food Organic and Garden Organic) waste collection capitalising on this will, and how these programs can feed back into community gardens.

Michael, Peter, Joek and I also discussed the use of technology in the gardens. One thing that cropped up was record keeping. Many of the community gardens keep records of crop rotations and other information collected in day-to-day operation of the garden. These records are then paper based and not easily shared around. We agreed that there is an opportunity to explore developing an easy-to-use app for keeping records of crops, inputs and outputs, and other details. The app can share these details with community garden members or even with other community farms. Interestingly, the idea of an app has been mentioned by several community gardens that I have been in contact with, some have even developed rudimentary systems to keep records electronically...maybe a chance to test out your app developing skills?



We encourage you to register for the upcoming **Urban Agriculture Showcase** on 18 November. We have a great line-up of speakers, including researchers from the University of Sydney, UNSW, CSIRO and more. We also have speakers from industry and local community gardens all talking about their experiences with growing produce in the urban setting, and research they are doing to enable production in urban environments.

[Read further about Urban Agriculture](#)

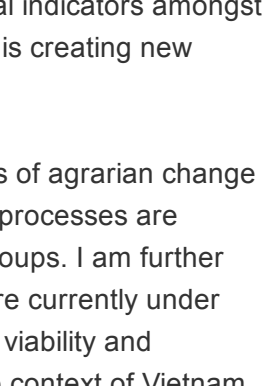
Quality Food

Tom Roberts

Much of the research conducted by members of SIA crosses over between two or more of our seven themes. The research described below by A/Prof. Jenny-Ann Torbjo provides connections between the Quality Food theme and two of SIA's other themes, Development Agriculture and Animal Agriculture. Here, the Quality Food issue is the origin of safety of cow's milk, particularly the risk of people contracting tuberculosis from drinking unheated (raw) milk; the developing country is Fiji, and the link to Animal Agriculture (besides the food of course) is that the dairy cattle involved are struck down by bovine tuberculosis, a chronic disease.

Partnering with Fiji to tackle Bovine Tuberculosis

Bovine Tuberculosis (bTB), caused by *Mycobacterium bovis*, is a zoonosis resulting in chronic disease in cattle and extra-pulmonary tuberculosis in people who are exposed via consumption of raw milk or living in very close contact with infected cattle. bTB in cattle reduces production and shortens lifespan creating a significant economic burden for cattle industries. Internationally programs to control bTB in cattle often rely on test and cull and hygienic practices, plus efforts to control the disease in infected wildlife reservoirs where these exist.



Recognising the adverse impacts of bTB, Fiji started a Brucellosis and Tuberculosis Eradication and Control (BTEC) program during the 1980s that has been sustained by government funding and industry cooperation. However, evaluation of the program lasted for an extended period until **Associate Professor Jenny-Ann Torbjo** partnered with the Fiji Ministry of Agriculture (MOA) to assist data collection and analysis. An initial **retrospective analysis 1999-2014** based on collation of herd autopsy records found no evidence of disease reduction over this 16-year period. To their credit, the Fiji MOA leadership responded proactively to this finding implementing improvements to on-farm testing and record keeping, and alongside the Biosecurity Authority of Fiji implemented cattle movement restriction. Furthermore, a National bTB Stakeholder Forum was held in May 2017 to formulate a new BTEC strategy that was endorsed by government and industry.

A **subsequent retrospective analysis 2015-2020**, based on data from a consistent on-farm testing protocol and more complete records, found BTEC on-farm test coverage was highest among dairy cattle in Central Division (~73%), where bTB was found to be highly prevalent with 7.8% of dairy cattle and 61.7% of dairy farms found to be positive between 2015 and 2020. Unfortunately, this study also found no visible downward trend in bTB prevalence over the 6-year period. Factors contributing to bTB persistence such as significant numbers of untested animals and uncontrolled animal movements, will be discussed at a National bTB Stakeholder Forum later this year.

In addition to investigation of bTB in cattle, with funding from Sydney Infectious Diseases Institute, we have collaborated with MOA and the Ministry of Health and Medical Services to improve understanding of bTB exposure for people in Fiji. This found high risk practices continue in some dairy farmer/farmer worker households, with 41% (68/166) reporting backyard consumption of milk from their cattle without boiling it, and 57% (96/168) reporting backyard slaughter of cattle, predominantly for family and village events.

This collaborative research provides clear evidence that bTB remains a serious concern for the Fiji dairy industry. bTB control is a national objective that requires multi-stakeholder engagement, regular review to measure success and research to identify the targets for focused action and education.

[Read further about Quality Food](#)

Carbon, Water and Soil

Federico Maggi

Early in June this year, I was invited to attend the launch of the 2022 release of the EPI – Environmental Performance Index in a joint event at Yale University, Columbia University, and with the Danish Climate, Energy & Utilities Minister, Dan Jørgensen. The EPI is an evolution of the original concept (the Environmental Sustainability Index) started in 1999 at the World Economic Forum's elaboration on composite indicators of sustainability of countries. The concept remains in the current EPI2022, but it has been enhanced by new data availability and data-driven methods to identify sustainability issues, and to serve the purpose of analysing trends to meet the Sustainable Development Goals (SDGs) of the United Nations. The event was very engaging. The Minister Dan Jørgensen was invited to give a talk because Denmark has been repeatedly ranked the most sustainable country in the world over the past EPI releases. It was a learning experience, where he explained in very simple words that achievements of the Danish government in sustainability were a succession of long-term plans for a long-term vision, collaborations between all government institutions, and the engagement with researchers. Yes, research was key for sustainability in Denmark, suggesting that scientific advances were incorporated into their strategic plans.

The EPI2022 ranks 180 countries on 40 performance indicators covering climate change, environmental public health, and ecosystem vitality. These broad issue categories include emissions, agriculture, water and others (see Figure ES-2 below).



Figure ES-2. The 2022 EPI Framework. 40 performance indicators fall into 5 issue categories, which are aggregated into three policy objectives. Weights show the percentage of the total EPI score.

Where does Australia sit in the EPI2022 ranking? Overall Australia ranks 17th worldwide. Amongst all indicators, further details can be viewed by their [web portal](#). In climate change mitigation, Australia ranks 71st, well behind most wealthy western democracies, with this suggesting that the Australian government priorities to reduce emissions of GHG including from land use via soil sequestration requires urgent action. In agriculture, Australia ranks 9th worldwide, with sustainable use of agricultural inputs such as fertilizers (56th) and pesticides (1st). However, additional indicators of sustainable performance in agriculture could be introduced in relation to water use such as for irrigation, in relation to the state of soil and soil carbon (e.g., the 4per1000 target), and in relation to agricultural practices such as conservation (e.g., no tillage), sustainable, and carbon-neutral farming.

These indicators are interesting to place one country in relation to another and provide a wider context to see – and to measure effectiveness of – how regulatory bodies are capable to affect trends in sustainability and, along with the Danish experience, incorporate research experience and scientific evidence. You may like to disagree the full report and form your own opinion on that framework, but I believe that whether the message comes from an indicator, or from our own work, or from direct field experience, we may all appreciate that agriculture has an enormous relevance to the environmental quality, and that we at SIA can contribute a lot in making agriculture sustainable. A brilliant example is the **One Basin CRC**, the initiative where the University of Sydney is a Tier 1 Research Partner, with SIA members directly involved in research programs. The One Basin has the mission to reduce exposure to climate, water and environmental threats in the Murray-Darling Basin, with a clear aim to address productive, resilient and sustainable irrigation regions.

[Read further about Carbon, Water and Food](#)

Development Agriculture

Daniel Tan

Sustainability and Livelihoods in the coffee and pepper growing Central Highlands of Vietnam: Jeffrey Neilson

After more than a year, without any international fieldwork, it was exciting to get back to our research sites in the coffee and pepper growing regions of Vietnam. ACIAR has funded a 4-year multi-partner project (2021-2024) involving the University of Sydney, working alongside the World Agroforestry Centre, Vietnam's Institute for Policy and Strategy for Agriculture and Rural Development (IPSRAD), and Tai Nguyen University.

The Central Highlands are now the world's second largest coffee producer (after Brazil) and the world's largest producer of black pepper. This is remarkable as Vietnam only emerged as a global player in these crops during the 1990s following the liberalisation of the rural economy. The growth of these industries has been dramatic and it has been led by dynamic smallholders, many of whom have migrated to the region from other parts of Vietnam. Per hectare yields are some of the highest in the world. It is estimated that one million Vietnamese households grow these crops, which have contributed significantly to national poverty alleviation efforts. The world's major coffee companies (like Nestle, Jacobs Douwe Egberts and Lavazza) and pepper buyers (like McCormick) now consider the Highlands a strategically critical global source region and are implementing various sustainability programs to ensure ongoing supply.

At the same time, the rapid expansion of these crops has come at an environmental and social cost. Much of the Central Highlands have now been cleared of their native forests, groundwater is being depleted for irrigation and farmers tend to overuse synthetic fertilisers and pesticides, leading to eutrophication, soil acidification and loss of soil fertility, as well as increased input-intensive farm practices. The highlands are also the ancestral homelands to several ethnic minorities (such as the Ede, Monong and Jara) people with languages and cultural practices that set the apart from the majority Kinh Vietnamese. Industry growth has attracted Kinh migrants to these fertile highlands and there is now far less land available for traditional land practices. Poverty rates and social indicators amongst ethnic minorities remain well below national averages, and intense competition is creating new winners and losers from the development process.

My contribution to the larger ACIAR project seeks to understand how processes of agrarian change are affecting rural livelihood outcomes in the Central Highlands and how these processes are impacting sustainability and the experience of poverty alleviation by different groups. I am further examining the rise of 'landscape approaches to sustainable sourcing', which are currently under development by global lead firms and their NGO partners. I am assessing their viability and effectiveness in promoting enhanced environmental and social outcomes in the context of Vietnam. Research findings will be fed into key decision-making processes within the Vietnamese government, corporate policies and the agendas of development agencies, while contributing to an understanding of agrarian transition in late-industrialising countries.

On this May visit, our team visited three of our four case study villages (in Dak Lak and Dak Nong provinces), each of which were dominated by Ede, Monong and Kinh communities respectively. We were involved in collecting individual life histories and collective village histories, trialling 'Photovoice' methods, undertaking gender mapping and running gender-oriented workshops and focus groups.

Villagers using 'Photovoice' techniques to present their challenges

Women-only focus groups

Interviewing villagers about their livelihoods

[Read further about Development Agriculture](#)

Alumni

Emeritus Professor Peter Quail

We have recently moved several of our agriculturally focussed University of Sydney theses into the SIA offices. We thought it important to keep these outstanding records of achievements close by and accessible. As we moved the lot, I came across the PhD thesis of **Peter Hugh Quail**, Peter, originally from Cooma NSW, completed an agriculture degree in 1964 and then completed a PhD, graduating in 1968 with a thesis titled "A Study of the Biology and Control of Wild Oats (*Avena fatua* L., & *Ludoviciana Dur.*)" The thesis highlights research into seed dormancy in wild oats from an agronomic and physiological context. Much of this work was conducted at the Northwest Research Institute in Narrabri and across local farms in the region.

His later interests in the molecular control of light perception, and interactions between phytohormones and genetic targets, can be seen in the detailed preliminary biochemical experiments involving abscisic acid and gibberellin treatments to control and overcome seed dormancy in wild oats. Peter's research career since leaving the university has been tremendous. Important discoveries aligned with Peter's research includes the identification and characterisation of the phytochrome-interacting factor (PIF) sensory molecule (a bHLH transcription factor), which perceives light by plants and transduces the signal to targeted genes. Other areas he has made significant contributions include the development of research tools incorporating ubiquitin promoters for constitutive gene expression in plants, and the detailed characterisation of bHLH transcription factors operating in plants. Peter is currently an Emeritus Professor at the University of Berkeley and still publishing and pushing the boundaries of plant science.

Dr Brendan Brown

Brendan completed a BSci (Agriculture) Honours (Soil Science) in 2010. After backpacking and undertaking work experience in Eastern and Southern Africa in his first university holidays, Brendan graduated in 2010 with Honours in Soil science and then moved to Canberra to work as a graduate research officer with the Australian Centre for International Agricultural Research (ACIAR), as part of the Cropping Systems and Economics and Land and Water programs. Here, he was introduced to the importance of agricultural development research and spurred a decade of research in this space. From Canberra, he undertook a one-year placement with the Food and Agricultural Organisation of the United Nations, working on their development programming in northern Ghana, before returning to the University of Adelaide to undertake a PhD on agricultural innovation, extension and impact evaluation with the ACIAR SIMLESA project. This PhD was a collaboration between the University of Adelaide, CSIRO and CIMMYT (across seven countries in Africa). Since 2018, Brendan has been an Agricultural Innovation Scientist based in Nepal with the International Maize and Wheat Improvement Centre (CIMMYT), where he explores the pathways to socially inclusive sustainable intensification in South Asia. He contributes with a diverse portfolio of projects funded by ACIAR, BMGF, and USAID.

In his PhD, Post Doc and ongoing research, Brendan has developed and published multiple novel quantitative and qualitative frameworks to help understand how to plan for, implement and evaluate change processes in agricultural systems. His academic research applies mixed methods and novel theoretical frameworks to more deeply understand the sustainable intensification of smallholder agriculture. His passion is to move scientific research from 'shelf to field'. Most recently he led the ACIAR 'Sustainable and Resilient Farming System Intensification' project in it's final 'scaling' years. His publications cover Africa and South Asia, and he also has ongoing work in Cambodia.

