



# The Crawford Fund 2019 Annual Conference

## WEATHERING THE 'PERFECT STORM':

Addressing the Agriculture, Energy, Water, Climate Change Nexus

### Scholar Reflections



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## - CRAWFORD FUND COMMITTEE SUPPORTED SCHOLARS AUSTRALIAN CAPITAL TERRITORY

**Jordan Cox, Australian National University**

**Mentor:** Madaline Healey, University of Sunshine Coast

The 2019 Crawford Fund Scholar Program was an incredible opportunity for early career researchers to engage with the key issues complicating the ways access to nutrition is changing for global communities. This year's conference was centred around the themes of water, energy and food in a changing climate using Sir John Beddington's 'Perfect Storm' to explore the expected changes for the ways in which global communities supply and access nutrition.

The first day of the Scholars Program began with a formal opening address from the Hon John Anderson AO. As a former leader of the National Party (and former Deputy Prime Minister), lifelong farmer, and fervent advocate for not-for-profit sectors and international agricultural research, his opening laid bare the considerable challenges we now face in relation to water, soil and food security. However, this clarity was punctuated by optimism, bringing welcomed encouragement for the group of budding researchers in attendance. A heartening, collegiate atmosphere was carried throughout the afternoon as the conference scholars were immersed in new learning experiences- it was here where conference scholars and their mentors were able to meet researchers from other disciplines, creating a collaborative atmosphere and knowledge exchange between the various research fields.

As a young forestry researcher, it was great to get the research perspectives of my mentor, an entomologist developing integrated pest management programs for sub-tropical agroforestry production systems. These enriching experiences continued through to the Sir John Crawford Memorial Address delivered by Professor Ross Garnaut AC that evening: a fitting person to be speaking on the vast opportunities which present for Australian researchers and industrial innovators to contribute to the decarbonisation domestic and global economies. Professor Garnaut continued to stress, as he has done for some years now, the importance of substantive efforts to mitigate climate-change, while he cautioned against weak policy stances which won't deliver the economic transformations required for sufficient innovation and adaptation.

The second day saw conference scholars attend the Crawford Fund Annual Parliamentary Conference at Parliament House. The morning keynote address was delivered by Professor Sir Charles Godfray who spoke about the outlook under the perfect storm nexus. Sir Charles explored the challenges that humanity faces in the context of anthropogenic climate change: population pressures, poor nutritional outcomes and increased resource scarcity which are likely to impact production possibilities and result in increased geopolitical shocks. He went on to say that there are numerous opportunities to address some of these issues, and that encouraging high-income contexts to more readily follow World Health Organisation dietary guidelines presents a bona fide win-win for constraining the growth of carbon emissions at low cost levels.

I found the subsequent speakers at the conference to be thoroughly engaging, and I'm very thankful to have had such an incredible opportunity to hear from expert researchers and some unique perspectives from forward-thinking corporate leaders, such as Sarah Barker (Minter Ellison) who spoke on the opportunities of viewing climate change through the 'liability risks lens of institutional investors'.

In closing the Scholar's Program on the final day, we heard from Andrew Campbell (ACIAR) on the merits of building a career in international agricultural research, and the potential benefits of leveraging international volunteering experiences for those goals. Through some further guided discussions, conference scholars were able to start useful discussions on where they hope to take their current studies or research. As someone nearing the end of my current research project, I found this process, and being part of the Scholar's Program more broadly, an invaluable experience. Attending this year's conference has allowed me to better connect with members of the RAID Network (Researchers in Agriculture for International Development), and to start thinking about some of the opportunities in international agricultural research for development.

It has been an absolute pleasure and privilege to be involved with the Crawford Fund Scholars Program for 2019 and I am very grateful for the support. I would like to sincerely thank the Crawford Fund and organising committee, the ACT committee and mentors, the distinguished guests and speakers in attendance, and the generous donors whose support makes events such as these possible.

**Madi Hickey, Animal Health Australia**

**Mentor:** Jenny Hanks, Crawford Fund VIC Committee

This year's Crawford Fund conference "'Weathering the 'Perfect Storm': Addressing the Agriculture, Energy, Water, Climate Change Nexus" encompassed a range of challenges, perspectives and food for thought.

The conference provided an excellent opportunity to network and meet like-minded individuals from a range of different backgrounds and interest areas. I really valued the knowledge and experiences they shared, and my



attendance has broadened my understanding and motivation to pursue my interest in international research and development.

The impact of climate change on food security raises numerous challenges. The conference presentations highlighted the significant disparity between food production and nutrition issues faced within the developed and developing world. On one hand, we see undernourishment and limited food supply, and the other, obesity, overproduction and food wastage. The issue of overproduction raised the important point of changing the focus from producing 'more with less' to 'enough with less'.

As an animal scientist, I was particularly interested in the discussions around the impact of animal production and red meat consumption on the environment. Throughout the conference, livestock production was identified as a key contributor to global greenhouse gas emissions largely through ruminant enteric methane production. The potential to use feed additives to reduce emissions as presented in Dr Di Mayberry's paper 'Reducing GHG emissions from red meat in Australia and developing countries' highlighted the role innovations can play in navigating the environmental impacts of animal production. I am looking forward to seeing how this technology and other strategies progress in this area.

Other innovations, like the Biofilta Foodwall – a climate resilient food growing system - highlighted the role technology has in improving food security by utilising resources and working to the strengths and limitations of the environment. I also really enjoyed Sarah Barker's honest take on the future outlook on the environment from an economic lens and the impact that market and social factors have in driving change.

A key take home for me was the need for dynamic change and innovation to improve global food security – I am motivated by the research being conducted and am optimistic for the future. I would like to thank the ACT committee for sponsoring my attendance and the event coordinators for their time and effort in organising the conference and scholar days.

**Amy Mackenzie, CSIRO Ag & Food**

**Mentor:** Jay Anderson, University of Queensland

If I didn't know a career in agricultural science was right for me until the Crawford Fund 2019 Conference, I certainly do now. Attending this conference, titled "Weathering the 'Perfect Storm': Addressing the agriculture, energy, water, climate change nexus", reinvigorated my drive for fighting the current and impending climate crisis in any way I can. It really emphasised the need for sustainable agriculture, and the ways in which agricultural research can help overcome the challenges of a planet in crisis.

I particularly enjoyed the scholar activities, which highlighted career paths that I was previously unaware of and opened my eyes to the possibilities of volunteering in developing countries. I was fortunate enough to have a young mentor who recently volunteered in Laos, and her advice (both career-wise and conference-wise) was one of the best parts of attending the conference. Since this was the first conference I have ever attended, I think the mentoring program was incredibly beneficial for me.

The 'speed meeting' activity where we got to meet other scholars and their mentors was also a highlight of the scholar activities. This exercise helped me talk to senior researchers and other scholars, which gave me valuable insights into the other areas of agricultural research.

The conference itself was eye opening, especially the talks from the two keynote speakers, Professor Sir Charles Godfray and Sarah Barker. Sir Charles Godfray gave a talk titled "Can we feed the world without wrecking the environment?", in which he highlighted the contributions of each agricultural sector to several key issues, including greenhouse gas emissions and water usage. From this it was clear that animal products make the largest contribution to greenhouse gas emissions. He posited the question "what if we all ate healthily?" and showed that if everyone ate according to the health guidelines developed by the World Health Organisation, which is primarily a flexitarian diet, we could reduce the increase in food-system associated greenhouse gas emissions from 51% to 7% by 2050. This figure really resonated with me and demonstrated that the future needs to become more plant-based. Sarah Barker also mentioned this issue of supply and demand, and that if demand does not change (ie. If consumers do not change their diet) then supply is unlikely to change.

While it was clear that the planet is facing massive challenges (hunger, malnourishment, obesity, land and water loss), the overall tone of the conference was ultimately an optimistic one. I learned what world-renowned scientists are doing in their own fields to combat the issues faced with a changing climate, and that there are ways in which researchers can lead the way into a more promising future. Importantly, I realised that even if policy-makers do not take the necessary steps to protect our future, industry still can.





**Jana Phan, Australian Academy of Science**

**Mentor:** Deirdre Lemerle, Crawford Fund NSW Committee

I wasn't sure if I was eligible to apply, I didn't know if I was the right fit... but heck, what did I have to lose?!

Thank you to the Crawford Fund's ACT committee, you've provided me an experience that will, no doubt, shape my career in research for agriculture in international development (RAID).

The mentor-mentee partnership is arguably the central pillar of the Crawford Fund's Scholar Program. I arrived on day one not knowing anyone and left the conference with a more elaborate network. I met my mentor, Prof Dierdre Lemerle, and we quickly got chatting about my future ambitions of working in SE Asia. Dierdre's experience working in Laos inspired me to make my career ambitions come true. Her extensive network soon became mine too as we ran around meeting people. The mentor's role in connecting junior professionals, like me, with their extensive and experienced network was invaluable.

Chatting to the other scholars over delicious apple muffins and tasty coffee, I felt at home: we all have ambitions to work in the RAID sector, we all come from diverse disciplines and backgrounds, and we all had no idea what we were doing about this thing people call a "career". This was refreshing, I wasn't alone.

The scholar program provided me with opportunities to chat to researchers who have taken diverse career paths. It was surprising to hear from industry representatives and learn what the "big multi-nationals" are doing for RAID, this was a welcome challenge to my preconceived ideas. The conference itself was incredibly intellectually stimulating. An intense day loaded with numerous examples of how the community are coming together to address the agriculture, energy, water, and climate change nexus. I was delighted to hear the messages presented from the two keynote speakers: Professor Sir Charles Godfray and Sarah Barker. They introduced ideas that I had not yet explored in the RAID context – how can we feed the world sustainability through an economic modelling and finance and liability lens, respectively. These talks were very impressive and inspiring. They finished their talks with a clear call for change.

To those students and junior professionals interested in pursuing a career in RAID and considering whether to apply, I encourage you to do so. The atmosphere created during the Crawford Fund's Scholar Program and at the conference is stimulating, nurturing, and motivational. The opportunities to learn from, and chat to, people working in all the different facets of RAID are truly eye-opening. It was an enthralling experience for me.

The Crawford Fund have played a significant role in shaping my career and ambitions. In 2016 the South Australian committee supported my internship at the United Nations Food and Agriculture Organisation, Rome, Italy. During this time, I became very interested in the development and analysis of evidence-based policy. After completing my PhD, I pursued a policy analyst position at the Australian Academy of Science and have been working in science-policy, evidence-based policy development, for a year now. Participation in the 2019 Crawford Fund Scholar Program has made it clear to me that evidence-based policy is imperative for sustainable development, for RAID. My newly extended network confirmed to me that my ambitions and interests in working on science-policy for RAID are needed and I am determined to make an impact.

## NEW SOUTH WALES

**Naomi Diplock, AVP volunteer, National Mushroom Centre Bhutan**

**Mentor:** Hugh Wallwork, SARDI

Attending the 2019 Crawford Fund Conference and Scholars program was a thought provoking, inspiring and enjoyable opportunity. While for me meeting highly experienced, motivating and encouraging mentors and associates was the main highlight, the theme 'Weathering the 'Perfect Storm': Addressing the Agriculture, Energy, Water, Climate Change Nexus' was also of particular interest.

The keynote address delivered by Dr Bruce Campbell, leader of the CGIAR CCAFS Program captured me with visions that were alarming, while also giving messages of hope and optimism if we rethink and rework our current approaches to farming. With an outlook of current agriculture only being able to achieve 20-40% of the world's food requirements in 11 year's time, and the same number of growing seasons to achieve the Sustainable Development Goals, this is a wakening and challenging prospect.

Through the various sessions, there was an overall focus on the need to commit to change and to work together to address this looming crisis, with a focus on climate crisis aversion through worldwide partnerships and committed change, while ensuring that no one is left behind. This must involve nexus thinking and nexus action, with the agriculture-food-nutrition-human health-planetary health nexus as a focus in policy and decision making. These thought-provoking sessions gave me a new insight in the financial aspect of climate change and the importance of the need for leadership to come from industry, communities and influential individuals with high hope that governments and policy makers follow. This must include social awareness, with evidence to justify decisions and an underlying foundation of thinking and acting globally.



The Scholar Days activities were highly relevant, and being assigned a mentor as experienced as Dr Hugh Wallwork made it even more so. Dr Lester Burgess also took me under his wing to ensure I met with valuable and important contacts. The activities focused around networking were fun and engaging and I have come away with contacts that may have transformed my future path. These activities were consistent with the theme of working together, while providing opportunities to meet a wide range of people from different fields and providing a link between disciplines. While I have come away from the conference with a fear for our future, I also have high hopes of change and see opportunities to help address these challenges. I have a deeper understanding of the need to address environmental impacts, while keeping in mind the vast social impacts drastic change may have. It is fundamental that we address these issues together, globally across disciplines, through strong partnerships and an inclusive approach.

Thank you to the Crawford Fund for the opportunity to attend such an enriching, educational and connecting event. I am grateful to have had this opportunity and am positive it will have long lasting impacts on my future thinking and career.

### **Francesca Earp, University of Sydney**

**Mentor:** Emma Zalcmán, Ausvet

The opportunity to attend the 2019 Crawford Conference ignited an 'impatient optimism' within me. I left with a sense of positivity about the future of agriculture and development, motivated to make positive change.

I have been working in Laos as a member of the Mekong Livestock Research Group, through The University of Sydney since 2018. First joining the team during my honours project working on an Australian Center for International Agricultural Research (ACIAR) project with The University of Sydney and The Department of Livestock and Fisheries. Since then I have continued working with the team, living in Laos as an in-country implementation officer whilst also completing a PhD with the project.

I have loved working in country becoming passionate about food security, female farmer empowerment and improved education as part of agricultural development projects.

Working in country can be daunting at times, with problems seeming too big for one person, one project or one program to fix. As I've lived in country, I have learnt to celebrate the small wins. Attending the Crawford Conference reminded me of this. The conference, despite its focus on 'the Perfect Storm' was surprisingly uplifting. Providing speakers, scholars, attendees and mentors with a space to discuss the real and tangible difference we can all make.

In a world that asks us to make a difference, the Crawford Conference reminded us to say yes. That female farmer engagement is more than just a buzzword, affirmative action is bigger than just waiting for policy to change and that sustainability is achievable.

I was moved by Keynote Speaker, Sarah Barker who made the comment 'the world can not continue to expand as it currently is'. Rather than being a critical reflection of the current status quo I saw this as an invitation, an opportunity to be better. Agricultural development must ensure that we focus on sustainability as well as food security, something I myself had lost sight of in the task at hand. It is our responsibility to provide the best agricultural development possible, ensuring that we take into consideration our current global context. We are living in a new world, one that must consider its impacts on environmental sustainability in order to survive.

I was inspired by the discussion of the agricultural and industrial revolution that started with Keynote Speaker; Sir Charles Godfray and carried all the way through to Sarah's address. The world has undergone revolutions before, and it can undergo them again. Just because we cannot continue as we currently are does not mean we cannot continue at all. We can always make positive and influential change.

I was honored to have the opportunity to attend the Crawford Conference as a 2019 scholar and I am excited to engage in the challenge the conference has set. I aim to see my own work in a new light, accepting my responsibility to make positive change whilst using myself as a vehicle for the message of change.

### **Angus Mitchell, University of Sydney**

**Mentor:** David Gale, Plant Health Australia

The Crawford Fund 2019 conference was all about the big picture - about how we can weather the 'Perfect Storm' taking into consideration the Agriculture, Energy, Water, Climate Change Nexus. As an engineer, this was a change of pace for me. The conference helped me understand that agricultural engineers can no longer relegate the complexities of agricultural development into a few sentences in the beginning of our abstracts. Rather, the complexities of international agriculture and nexus thinking need to make their way into every aspect of our work, from project foundation to programme delivery. The conference also provided amazing networking opportunities through ample networking sessions and breaks, and through the RAID careers development and networking events. This allowed me to connect and converse with academics and professionals from a wide variety of sectors and institutions. I'm still in contact with many of these people and have found this connection invaluable.





If we are to weather the 'Perfect Storm', we can no longer work in sector and institutional 'silos'. Instead, we must work in collaborative and interdisciplinary partnerships. This was highlighted by Dr Aditi Mukherji's work, examining the impact of the 'green revolution' on Indian groundwater and energy resources. This was a poignant example of the consequences of a failure to collaborate across sectors. Charles Godfray also highlighted this through his work on changing diets, emphasising the need for locally sourced and culturally relevant solutions such as the 'flexitarian' diet. For me these and other speakers brought home a message of needing to move beyond food security - to something closer to 'food sovereignty' - with aims to provide ecologically sound, locally determined and culturally appropriate diets rather than just sufficient calories.

The networking opportunities were plentiful. There was always someone interesting to approach, and always enough time to do so. This is important to me as an outsider to this field, as it provides an opportunity to connect with others beyond my regular sphere. I am soon to embark on a year's international placement in South East Asia, so it was particularly helpful to talk with those with experience in that region.

The RAID sessions were also exceptionally planned and executed. The first RAID session set the tone for the conference, with a carefully designed mentor system that ensured everyone felt connected and included. The following sessions informed the scholars about a range of activities and opportunities for work and research in international agriculture. In particular, hearing from other early career researchers was invaluable, as it provided examples of potential pathways for research and work, including funding, scholarship and graduate opportunities.

The conference was an outstanding opportunity to learn about the research and development projects that are occurring in international agriculture. The conference also provided networking opportunities with early stage and established researchers for international agriculture which was invaluable.

**Lucy Noble, University of Sydney**

**Mentor:** Jack Hetherington, RAID

My entire experience as a Crawford funded scholar at the 2019 Conference, was an eye-opening and profoundly positive experience. The opportunity to hear from and then speak to such a variety of people about the work being done in their field, was an aspect of the Conference that stood out as uniquely insightful and gratifying opportunity. Having an interest in the world of international agriculture as an undergraduate student, can often feel like a rather small and quiet field of work. However, hearing some of the world's leading pioneers address what they consider to be pressing cases in response to - 'Weathering the 'Perfect Storm' - Addressing the Agriculture, Energy, Water, Climate Change Nexus', highlighted how very present the community is and how misguided I was. The calibre and insight of the speakers throughout the day was remarkable and concreted my understanding and fuelled my professional interest.

Professor Charles Godfray commenced the day as the first Keynote Speaker, proposing the loaded question - "Can we feed the world within planetary boundaries?". If there were an easy answer to the question the Conference would arguably not exist. However, Professor Godfray presented a collection of extremely profound and well-founded suggestions that left us pondering Malthusianism principles, the opportunities of small-scale institutional structures in Sub-Saharan Africa and the absolute necessity to stress test commodities.

Focusing more on the Theory of Change, Dr Bruce Campbell, highlighted the importance of adaptation and mitigation in agriculture, particularly in relation to the empowerment of the farmer and consumer. With an unprecedented increase in the incidence of record-breaking temperatures, comes reduced investment and productive assets. Dr Campbell went on to present examples of the private sector, government bodies and individual producers, all adapting to these changes seen in the Agricultural sector in response to extreme climatic events. Although ultimately, serious political commitment to change remains a critical factor in addressing the 'Perfect Storm'.

The case studies presented in session 3 and 4 all explored different opportunities in the international sector to adopt sustainable agricultural practices and the effect of these possibilities in rural communities, both within and outside of Australia. Professor Alice Ferrer introduced the concept of, 'Climate smart Villages'. The idea behind the villages is that they provide a platform and vessel for farmer-to-farmer trade of information as well as informing national policy. Dr Di Mayberry focused on the current research into red meat GHG emissions and the possibilities that exist to also utilise policy and funding in order to reduce the impact of ruminant production. As the final speaker in the fourth session, Marc Noyce, approached the Perfect Storm as the CEO of Biofilta. Despite being motivated with clear business motivations, the attainment of financial return could only be satisfied assuming that social good had been achieved. Sarah Barker closed the day with a thought-provoking review of the financial risk and economic policy that surrounds the uncertainties of climate change.

The Conference did a remarkable job of holistically addressing many of the nuances of the 'Perfect Storm'. The days speakers were articulate, engaging and incredibly approachable. Along with the Scholar day activities, I left the Conference feeling invigorated and inspired to reach-out to many of the incredible people that I had met. However, I would like to thank those at the Crawford Fund, ACIAR, RAID and also Cathy Reade who ultimately facilitated my





experience and made it what it is. I also owe a huge thanks to my mentor, Jack Hetherington. Without Jack, I truly would not have had the same amazing experience, nor met the people I was able to meet. I hope this is the first of many Crawford Fund Conference I get the opportunity to attend, and I am extremely grateful for this opportunity to attend.

**Yolanda Plowman, University of Sydney**

**Mentor:** Eric Huttner, ACIAR

The theme of the 2019 Crawford Fund conference was, “Weathering the ‘Perfect Storm’, Addressing the Agriculture, Energy, Water, Climate Change Nexus” and certainly lived up to the high expectations I had, having attended Crawford Fund conferences in the past. The conference experience for me was invigorating and helped me build new connections with people I wouldn’t normally have the opportunity to meet. Not only did I get to attend the one-day conference as I have in previous years, this year I attended the conference as a Crawford Fund Scholar which provided me many opportunities to meet with interesting and engaged people in the food security sphere. On Monday, the day before the conference, we got the chance to hear from a number of people representing a range of areas in food security work and research. I found this particularly valuable as I was able to talk with key industry contacts about employment opportunities in the industry. We were also given the chance to meet our conference mentor, and to network with other scholars. These lively and engaging discussions continue into the night at the Sir John Crawford Memorial Address and Networking Dinner.

The highlight of the conference for me was hearing the keynote address by Professor Sir Charles Godfray from the Oxford University who posed the question, ‘Can we feed the world without wrecking the environment?’ Godfray spoke about ‘Malthusian pessimism’, which refers to the predicted pressures placed on our environment and food systems as a consequence of our growing global population. Although this is a current cause for concern, Godfray focused on what we can do, rather than what we can’t, and I found this to be an exceedingly uplifting and inspiring way to kick off the conference. Throughout the day we heard from an inspiring stream of men and women from diverse backgrounds who are experts in their chosen fields. Another outstanding talk was by Dr Aditi Mukherji, the principal researcher at the International Water Management Institute. Dr Aditi spoke at both the Scholar’s Day on the Monday and at the conference on the Tuesday. It was a pleasure to hear her speak at both events because not only was she an informative and interesting speaker at the conference, she spoke with sincerity and wisdom at the Scholar’s Day event. It was inspiring to hear about her experience of being a woman in leadership working in food security related research.

Finally, on the Wednesday we heard from RAID members who had spent time working in the field. These presentations and discussions were entertaining and energetic and showed the Scholars what they could expect as field work officers: the good, the bad, and the ugly. This session was positive and informative and was strengthened by the fun RAID networking event that had taken place the night before. Overall the Crawford Fund Scholar program was enriching for me and served as an opportunity to become more informed and connected in food security research and development.

## NORTHERN TERRITORY

**Paul Armstrong, NT Government**

**Mentor:** Tania Paul, Crawford Fund NT Committee

My first Crawford Fund conference was a great experience and being part of the Crawford Fund scholar program was a great opportunity that exceeded my expectations. The conference and scholar program were organised in a way to encourage people to meet others from different backgrounds and have great discussions. The conversations I had with my mentor from the scholar program, Tania Paul were really interesting and such a great part of the scholar program. She was able to share with me about her experiences of coordinating research projects overseas and some advice about developing a career in this space. Having been involved in the Crawford Fund for many years Tania was able to introduce me to some other people at the conference with overlapping interests which was really helpful. I think providing a great platform for positive discussion about the future of agriculture and related areas is one of the greatest strengths of the Crawford Fund conference and one that makes it particularly beneficial to all attendees especially to students and those early in their careers. I was also really interested in hearing the talks about the bigger picture assessments of the future of food production and the changes needed to address the climate change, water, and energy challenges of this century.

A highlight of the conference for me was the Sir John Crawford Memorial Address by Professor Ross Garnaut. It was great to hear from someone with great expertise in economics and a great understanding of development, agriculture and climate change. His message was particularly positive and inspiring because he shared about actions, which Australia and the world can undertake to address the challenges that we are facing. I found his address was also fantastic because of Ross’s working relationship with Sir John Crawford, which provided me a better understanding



of the history and mission of the Crawford Fund and also insights into the life of Sir John Crawford and his passion for agricultural research in Australia and neighbouring developing countries.

Many of the presentations highlighted how important the role of agricultural extension is in effecting change but also how important effective extension is as often there is only a small take up of beneficial farming methods and technologies in the agricultural sector. Included in these talks were examples of successful tools and methods for extension that can be applied to the aquaculture extension that we are doing with tropical rock oysters in remote Aboriginal communities of the NT. Another important take home message for me that came through in many presentations and conversations during the conference and the scholar program was the importance of building trust in relationships with those you are working with to be effective in delivering research, development and extension.

While the many of talks focused on the challenges facing agricultural food production, including climate change and resource limitations. I found myself asking how this applied to the production of food in the ocean from an aquaculture perspective. While shifting agricultural land use was identified as a key strategy in taking up and storing carbon on land during the conference, there is large potential in aquaculture food production to mitigate climate change and address the water and energy constraints ahead. One of the advantages of food production in the ocean is that it has relatively low requirement for direct freshwater inputs in many cases and the scale of ocean food production has the potential to be incredibly large. With the fast growth of aquaculture food production globally, now is the time to apply what we have learned from our agricultural history to the way we produce food in our oceans. In light of the climate change challenges and resource constraints we face, it would be great to see a focus on aquaculture that produces food more effectively with low water and energy use and aids in the protection of biodiversity in our oceans.

### **Meg Humphrys, NT Government**

**Mentor:** John Dalton, Crawford Fund NSW Committee

It was a great honour to win a scholarship to attend the Crawford Fund Conference.

The venue for the for the annual conference the Great Hall in Parliament House, was a grand location and I think is a reflection of the high level of importance the aspirations of the Crawford Fund are to Australia and the world. The painting in the background was also very remarkable.

The event was an amazing chance to meet other young people with similar interests and passions. The mentor program was fantastic for exchanging knowledge from experts and the youth. It is such a rare opportunity for young people to speak to people that have had incredible careers and have a wealth of knowledge in a space where they can share some of that knowledge. My mentor John Dalton was a wonderful match for me. He had a broad amount of knowledge and his career had mirror one much like what I would aspire for myself.

It was fantastic to discover pathways to working and having a career in agriculture for international development. The networking dinner and the way it was facilitated was spot on. There was such a diversity of people at the conference and that was reflected by ending it with Sarah Barker's talk. Sarah was a perfect way to end the day and I think asking her to speak is a credit to the organisers for showing the complexity of the theme of the conference.

Some of the key messages I went away with were that a flexitarian diet is actually better. I already thought this working in the rangelands. The concern for the planet is not just about increased carbon and human induced climate change it is also water and a vegan diet takes more water.

Reiterating the fact that food security and climate change are issues of global concern. The world, and its environmental and human (food, economic, social, etc) systems are all connected. What we do on part of the planet will affect others and how climate change affects some areas will ultimately affect others. For example, if rice yields are low in south-east Asian it will raise the price of rice around the globe and while it may not affect people buying rice from the supermarkets in Australia it will affect people in developing countries that rely on rice as their main food.

These issues need to be tackled at national and international government levels through effective, strategic and consistent policy level but also at a grass roots, community level working on how to deal with these issues locally for people that are on the front line. The example of the climate smart communities was fantastic for that.

A combined top down and bottom up strategy is needed so the people in the middle have to fall in-line. As Sarah said, ultimately money will drive people. However, it will be negligent if large businesses such as insurance companies don't factor in climate change because it will have a bottom line affect for them. The lead for dealing with climate change and water issues may ultimately fall in the hands of private business as governments will not have the resources and internal mechanisms to adapt enough or have the ability to leadership due the political environment of today so instead will need to react to solutions as they arise.

One of the stats that stuck with me from the conference was, in a way an answer to the age-old discussion... "How are we going to feed the world? We need more mechanised, genetically modified plants to do this!" There are 800 million people in the world that don't have enough food to eat, meanwhile we have 2.1 billion people overweight! If people are overweight or obese doesn't mean they are not malnourished. To me another take home message for the conference





was that world-wide adoption of a diet meeting nutritional guidelines in 2050 would reduce food-system associated greenhouse gas emissions from 51% to 7%. There is no silver-bullet but healthy, conscious eating would surely help the plight of our beautiful planet on many levels for physical and mental health, environmentally, economically and ultimately socially.

## QUEENSLAND

**Luke Dieters, *University of Queensland***

**Mentor:** Anika Molesworth, Crawford Fund NSW Committee and RAID

The Crawford Conference “Weathering the Perfect Storm” in 2019, allowed for me to experience a professional environment of networking, and conference speakers. Coming from a livestock and poultry production background, where I currently study sustainable agriculture this conference was directly related to my subject of study. Despite the limited presenters on livestock aspects, this conference provided an exciting platform to listen to other agricultural and nutritional professionals. Speakers ranged from Dr Ajay Mathur who was speaking on the interesting developments in New Delhi with solar pumps. Others included Di Mayberry who spoke about, ‘Raising the Steaks’ and the great strides Australia has made in the reduction of GHG emissions in the red meat industry. As this was directly relevant to my areas of interest, I was able to talk with her afterwards and ask her some questions.

Another interesting speaker was Sarah Baker who labelled herself as a “corporate lawyer who only cares about money,” this brought an interesting change in perspective. The Q&A sessions were very informative especially with Sarah Baker and Dr Charles Godfray, despite their massively different backgrounds and professions they had constantly overlapping ideas and opinions. Some great quotes that were said during this time included: “It’s not about producing more with less, but producing enough with less,” and “The transition to net zero is good for everyone but also different for everyone.” These quotes particularly stood out to me because they illustrated the, at times, tough but worthwhile future that we need to have in order to continue with a healthy earth and climate.

The Crawford Scholar activities were a further source of professional sources and activities, ranging from networking with other scholars and mentors (as well with my own), to speakers from ACIAR and Australian Volunteers. My mentor, Anika Molesworth, was an awesome match for me as she had experiences with a large range of areas that I was interested in, right down to capturing and selling rangeland goats on her family property in Broken Hill. I would like to extend a big thank you to not only the speakers at the conference and the scholar activities but also to those that arranged for me to come down to Canberra. It was an awesome experience and has helped me focus on the areas that I want to progress into for honours.

**Kazbek Dyussebayev, *Griffith University***

**Mentor:** TJ Higgins, Crawford Fund ACT Committee

The Crawford Fund 2019 Annual Conference titled “Weathering the ‘Perfect Storm’: The Agriculture, Energy, Water, Climate Change Nexus” and Scholar Program provided a great opportunity for listening to lectures of leading researchers and practitioners in the field of international agriculture and climate change.

I am extremely grateful to The Crawford Fund for selecting me as a scholar and to RAID for an opportunity to be part of their outstanding networking program.

In terms of the conference, there were many highly knowledgeable experts. One of them was Professor Sir Charles Godfray from Oxford University who spoke on feeding the world without destroying the environment. He showed very interesting statistics on global population growth and touched coming challenges: growing demand, hunger and over- and under- nutrition, agricultural pressure and water scarcity, climate change and geopolitical shocks. Then, Dr Bruce Campbell continued with his outstanding speech on large food challenges faced by the global community.

Furthermore, very informative presentation was given by Ms Sarah Barker, who is not only a professional expert on investment governance issues relating to climate change, but also a magnificent speaker able to gain attention of an audience. She mentioned all possible climate-related financial risks and also financial opportunities for the food sector. Many thanks to Professor Timothy Reeves and Dr Colin Chartres for finalising the conference with their meaningful talks encouraging us to work together against global agricultural challenges.

The most enjoyable part of the scholar program was meeting some wonderful people in my field. Thanks to RAID, I had a chance to talk to all scholars, who are early career researchers like me and passionate about learning more and more, and all our friendly and lovely mentors. Personally, I was very glad to have Professor TJ Higgins as a mentor and had learned a lot from him in short period of time. He is a very remarkable and experienced scientist and doing a great job as a volunteer in the field of international agriculture. Also, he gave me some very useful advice on next plans for my PhD project and future career.

Overall, the Conference and Scholar Program were exciting and really helped me to build my knowledge on global challenges in agriculture and climate change and new methods and technologies used towards solving these issues.



I highly recommend that other young researchers and students looking to further their career in agricultural research apply for the Crawford Fund scholarship programs in the future.

**Vithya Krishnan, *University of Queensland***

**Mentor:** Carl Menke, Griffith University

“Weathering the ‘Perfect Storm’” was an apt title for the 2019 Crawford Fund conference which addressed the agriculture, energy, water, and climate change nexus.

The depth and breadth of presenters allowed me to gain a better understanding of the issues surrounding the topics covered during the conference. I was particularly captivated by the presentations given by Professor Sir Charles Godfray and Sarah Barker. It was simultaneously depressing yet encouraging to hear from these experienced speakers within the science realm and in the corporate sector. Climate change is here and now, and the speakers addressed these issues with a push which is ultimately necessary. It was also interesting hearing from Sarah Barker and understanding how the corporate sector was responding to climate change.

The presentation by Professor Alice Joan G. Ferrer was also uplifting, as she talked about climate smart villages and the need for context specific approaches for agriculture within South East Asia. This is important given the variability in climate conditions, resources, and knowledge between various countries. Thus, the need to develop context specific approaches for each community is pertinent to their livelihood and well-being.

Mark Noyce from Biofilta also addressed food system challenges and presented an avenue for mitigation through their wicking garden which prevents high water usage during crop production. It was great to see its use within urban and rural environments and especially important when water can become a limiting factor in agriculture.

I also thought that there were great discussions and questions raised during the moderated Q&A sessions. It was good to hear from speakers and the thoughts from various audience members, especially about ways in which climate change can and needs to be tackled. The opportunity for networking during the conference was definitely a highlight. It was great meeting various people from fields outside of my own and learning from their experiences which really helps with putting things into perspective and with broadening my knowledge base.

I’m extremely grateful that I had this opportunity to be a part of the Scholar program and conference organised by the Crawford Fund. I like to extend my gratitude to the Queensland committee which offered me this opportunity to attend a wonderful event. I would also like to thank Cathy Reade and Larissa Mullet for coordinating and organising the scholar event and conference.

**Cristina Ocana Gallegos, *QAAFI, University of Queensland***

**Mentor:** Tony Fischer, Crawford Fund ACT Committee

Attending the CF19 conference has given me back a sense of personal empowerment and collective hope in my generation for the challenges that lie ahead in the agricultural realm. Having international agriculture research experts as mentors enhanced the whole experience and facilitated interactions with industry representatives from the Australian context. I was provided with profound insights of what it will take to create the next agricultural revolution and reminded that efforts from across all disciplines are required to tackle such challenges.

Personally, the first highlight of the conference came from Dr Di Mayberry’s talk, regarding GHG emissions linked to red meat consumption. She reminded us of the power we have to shape our environment and how we cast a vote for the world we live in, three times a day, seven days a week. Although alteration of our diets is often regarded as a sensitive topic, I believe that it is important to raise the question and stop the indulgent behaviours that had led us to our current environmental and climatic crisis.

Coming from a plant biotechnology background, it was interesting to learn about the financial and liability perspectives of climate change in Sarah Barker’s talk. The main take-home message was that climate change will also cause devastating effects in the economic sphere. Learning that some private entities are already leading the way to a more sustainable environment, by investing in clean energy for example, was inspiring and relieving. She also provided thought-provoking arguments that challenged us to be part of the change, because we no longer experience ‘Climate change’ but a changed climate.

Lastly, I was pleased to see the amount of women taking part in the conversation for this year’s conference, both as attendees and speakers. I particularly enjoyed Dr Aditi Mukherji talks and appreciated her proposal of ‘Maybe it’s time to slow down’, in the context of a consumerist and highly competitive society. It was the first time I heard someone proposing the opposite of agricultural and economic expansion and I applaud the boldness of her words. After all, I believe that going back to the basics is also part of the solution.

I am deeply grateful for the opportunity to attend the CF19 conference where I could learn about the efforts of every agricultural sector towards a more sustainable future. I also appreciate the opportunity to exchange ideas and learn from other Australian scholars and hope to see a growing community of young leaders taking part on agriculture.





## **Peta Stockwell, University of Queensland**

**Mentor:** Peter Wynn, Crawford Fund NSW Committee

Attending the Crawford Fund conference was an incredibly worthwhile and eye-opening experience. As a fourth year student attempting to navigate the next step in my career path, it was an invaluable opportunity to meet new people, gain different perspectives and hear about the exciting things currently happening in the world of agricultural research for international development.

The two scholar days were excellent; it was great to have presentations tailored to the scholar group from a range of interesting speakers. I found this resulted in speakers giving generally positive, informative and inspiring talks. Dr Peter Carberry described how young scientists have to act as change agents to tackle the various challenges faced by agricultural systems globally, while also being reflective and critical in order to develop the necessary learning culture. Dr Robyn Alders similarly addressed the audience of young people, discussing the perspectives of farming families, the decline in Australian aid funding, and working out how we can support international agriculture using our driving interests. An international perspective was provided by Dr Aditi Mukherji and Dr Jenny Hanks, while we were exposed to the role of the private sector by Dr James Nelson and Rebecca Boustead. The program delivered for us by RAID was well run and very informative for those unsure about how to begin a career working in international agricultural development.

The Sir John Crawford address was delivered by Professor Ross Garnaut. It was a captivating address highlighting the breadth of the Australian landscape, as he described the tragic scenes he had witnessed along the Murray-Darling, and the potential role our landscape has in the low carbon world economy.

The conference itself opened with Professor Sir Charles Godfray's keynote address. He delivered an incredible description of the climate nexus, highlighting the human perspective. He shared his outlook on our ability to live within planetary boundaries, and the need for a double-green revolution. He also made a point which was one of the key messages I took from the conference; if by 2050 we all adopted WHO recommended diets, not only would 5.1 million deaths be avoided annually, but a reduction in the increase in food system associated greenhouse gas emissions by up to 71% could be achieved.

Professor Sir Charles also introduced us to the term “economic vegan”, describing someone without access to animal source foods, stating that we have seen the detrimental effect this has on human livelihood. This was a concept that resonated with me, as I often feel those of us fortunate enough to have so much choice in our diet forget that there are still some who go without adequate macronutrients.

There were many incredible speakers throughout the day, all delving into the nexus issues from a unique perspective. Another resounding key message was the importance of understanding flow-on effects development activities may have in other areas. Professor Tim Reeves excellently synthesised the conference, reminding us of the “tremendous intrinsic value of food”, and that perhaps we should shift our focus to producing enough, rather than more, with less.

Attending the Crawford Fund conference has been one of the most valuable experiences of my undergraduate degree, I am very grateful for the support I have received. I would encourage anyone with an interest in this area to get involved.

## **Valentin Thépot, University of Sunshine Coast**

**Mentor:** Lyn Hinds, Crawford Fund ACT Committee

The Scholar Program for the 2019 Crawford Conference “Weathering the ‘Perfect Storm’ – Addressing the agriculture, energy, water, climate change nexus” was an enriching experience with both optimistic and less so take home messages, all of which had positive impacts on me personally and as a researcher. The facts cannot be ignored; our health and nutrition, the climate, and the environment are all interconnected. The time to act was at least a decade ago; we now need to limit the adverse events and one of the key paths we can take to achieve this is to change how we produce food and energy.

The scholar day was a great way to get to know our peers working/studying/researching ways to address the issues we are all too familiar with in regards to nutrition, farming and the impact it has on our environment. This is why, in my view, the presence of Bayer and Kellogg's on that day, considering their track records in environmental and human health, was controversial to say the least. In a world where we farm enough food to sustain the current population the focus should not be how we must farm more (“scale up”) with more chemicals, machinery and fossil fuels it should have been 1) how we farm it with minimal environmental and human health impact and 2) how we better distribute it and minimise waste. In addition, diet induced metabolic syndromes is a huge issue for first world countries and now increasingly so in the developing world. Sugar rich and processed foods are known to cause a range of serious life-threatening diseases. In 2014, 2 billion adults were overweight while 460 million people were underweight of which 600 million were obese. That year while 42 million children under the age of 5 were already overweight, 156 million children were affected by stunting. Something is clearly wrong with this picture and I highly doubt that “scaling up”



our farming practices the way we do now and have been doing for too long would help.

“What if we ate healthy?” as Professor Sir Charles Godfray puts it. If we did so, he predicts that GHG emission would drop and so would the rate of deaths associated with poor dietary habits. The forecasted financial benefits of eating healthy on environmental health and human health and wellbeing come to \$US 80trillion/yr! Although Dr. Aditi Mukherji acknowledged that this is a key strategy to reduce our impact on our environment the way we grow food matters. Tackling climate change not only positively influence the environment, it would simultaneously improve land, food security, nutrition and help to end hunger. A refreshing approach to growing food was one mentioned by Marc Noyce who showed us that food could come from small scale and highly productive systems. Including the community, school and teaching the next generation how to feed and grow food is essential for a better environment, better nutrition and overall wellbeing.

As a marine scientist working in aquaculture, I thought this area was greatly overlooked. Aquaculture being the fastest growing food-producing sector in the world, producing more fish than fisheries, and considering 71% of our planet is covered with water, this industry will be key to secure quality food for the growing population. Compared to agriculture, aquaculture is at its infancy. This is a critical time to shape this industry to warrant a sustainable and environmentally friendly development so we make sure the mistakes from its land counterpart are not repeated in the aquatic environment. Finally, a huge thank you to Cathy Reade who did an awesome job at organising the event and to the Crawford Fund for allowing me to attend this eye-opening conference.

## SOUTH AUSTRALIA

**Tara Garrard, South Australian Research and Development Institute**

**Mentor:** Lester Burgess, NSW Crawford Fund Committee

As an early career researcher, it is very easy to become focussed on your particular area of research and specialisation without considering the global picture. The 2019 Crawford Fund Conference “Weathering the ‘Perfect Storm’: Addressing the Agriculture, Energy, Water, Climate Change Nexus” provided valuable insight into the issues being faced globally in relation to climate change and agriculture. I came away feeling inspired after listening to talks that not only outlined where the areas of concern are, but also how we are moving forward and tackling these issues. Dr Di Mayberry discussed her research into innovative solutions to reduce emissions from red meat production, Marc Noyce spelled out a vision to turn our cement jungles green and Sarah Barker provided an insight into the changes that are already taking place in the corporate world to provide financial infrastructure for our changing climate. This pieced together a picture of how different industries and communities are making considerable progress towards food, water and energy production to weather the ‘Perfect Storm’.

The scholar program provided excellent networking opportunities throughout the scholar days and the conference itself. Having a mentor was instrumental in the networking being successful as they were able to introduce the mentees to key people within their networks who we would not have had the opportunity to meet otherwise. In addition to this, the coordinated networking activities and events were meticulously planned to generate authentic and insightful discussions. Meeting my mentor Lester Burgess was a highlight of the program for me as he has an extensive amount of knowledge and experience in my field of plant pathology. His passion and enthusiasm for his work is contagious and has inspired me to volunteer overseas in the future. I was very grateful for the wisdom and knowledge he imparted to me through stories of his travel. It was so encouraging to hear stories of research so closely linked with disease management and community engagement.

I have parted from the scholar program with a fresh perspective, a deeper understanding and more globally focussed research goals. In addition, I have met a broad range of people at all stages of their careers from students and early career researchers to executives and highly distinguished professors to add to my growing list of contacts, mentors and collaborators to help guide me in my career pathway. I would like to thank the Crawford Fund for allowing me to have this experience that has provided me with a diverse range of tools I will carry with me into the ‘Perfect Storm’.

**Natasha Hallett, University of Adelaide**

**Mentor:** John Radcliffe, SA Crawford Fund Committee

This year I was grateful enough to be able to attend this year’s Crawford Fund conference and be given the opportunity to participate in the scholar’s program. This year’s topic was ‘Weathering the ‘Perfect Storm’: Addressing the Agriculture, Energy, Water, Climate Change Nexus’ which was an incredibly intriguing topic to me as I am a Bachelor of Agricultural Science student. I wanted to gain a further understanding in these areas and comprehend how the agricultural industry will need to adapt to be able to combat the worlds ever-changing climate. Through attending the conference, my knowledge of the ‘Perfect Storm’ was amplified and I can now comprehend the issues which are not only being faced within Australia but also globally, especially with those in developing countries.

There were two speakers in the conference which intrigued me greatly and they were Professor Sir Charles Godfray





and Ms Sarah Barker who gave two new insights into how climate change is affecting all industries and not just the agricultural industry.

Professor Sir Charles Godfrey discussed the three waves of Malthusian pessimism which addressed the industrial revolution of the 1790's, the green revolution of the 1960's and 70's and the weathering of the 'Perfect Storm' in the present. He discussed the issues of agricultural greenhouse emissions with over 50% of it being animal products and how the largest growth rates are within developing countries. His main point was that yes, the 'Perfect Storm' is on track to occur, but he was confident in our ability to overcome the issues which we will face with the ultimate discussion being on the topic of what if we all ate healthily? And the benefits which this will have on the world. Finding out something as simple as changing our diets and eating according to what our environment can give instead of what we want was extremely intriguing to me and, although I already understood that changing our diets can help to feed those in developing countries who are malnourished, I did not understand the larger picture in which changing our diets can influence the effects that climate change has on our industry.

Ms Sarah Barker offered an alternative perspective on the climate change issue at hand. It started to open my eyes up to how the business sector is currently handling climate change. It was a surprise for me to find out that businesses are considering the effect of climate change on the environment and that they understand the effects it has on food supply. The biggest take home message that I got from her talk was the influence which stakeholders have over many industries. Finding out that many oil and plastic companies are struggling to hire graduates due to the job description going against their morals had me sitting up straighter in my seat and becoming fully aware of how my generation is influencing businesses to become cleaner and more renewable.

My participation in the Crawford Fund conference has really allowed me to open my eyes to new channels which I would like to pursue after I finish my Bachelor's Degree. It has given me a newfound knowledge and a chance to network with like-minded people and I am thankful for the opportunity given.

**Anh Duc Nguyen, Centre for Global Food and Resources, The University of Adelaide**

**Mentor:** Rohan Yargop, Centre for Global Food and Resources, The University of Adelaide

The inspiration for this year's Crawford Fund Conference, "Weathering the Perfect Storm" was Sir John Beddington's prediction of a perfect storm a decade ago. I was honoured to be one of the young scholars chosen from across Australia to attend the conference. Through a series of conference, training, and networking activities, I have gained a valuable knowledge, skills, and experience. More importantly, I have also developed my networking with other scholars, senior scientists and researchers from Australian and international research agencies, and other key stakeholders.

This year the conference focused on the significant impacts of climate change on agriculture, energy, and water systems and how different governments, research agencies, industries, and farmers have been trying to resolve the problems. Although the 'Perfect Storm' was still on track to happen according to Sir Charles Godfray, we can still make changes to address the coming challenges. The key messages from the invited speakers that impressed me most were that "climate has changed" and "farming as we know it will not be possible under the current system". Yet, I believe that our agricultural system can produce enough nutritious food, we must consider the agriculture food nutrition human health planetary model as a critical point in decision-making. Also, we should keep in mind that climate change has substantial impacts on 500 million smallholder farmers, mostly in developing countries. Thus, it is important to make necessary transformational changes but we must ensure that no one is left behind.

Beside the one-day conference, all young scholars had privilege to participate in a series of mentoring and networking activities, which I believe that it is a distinct feature only found in the Crawford Fund Conference but not other conferences. Through the conference, I was able to meet many interesting people whom I have a lot of respect and know them by their great work. Their life and work have inspired me to keep faith in continuing my career pathway, and to think of my future contribution in not just Vietnam, but other developing countries. I have also learnt that we can improve the efficiency of international agricultural research and development projects by working together closely as one team and sharing our knowledge and experience to gain more valuable insights of the current issues.

Through this piece of my personal reflection, I strongly encourage other young fellows to think of the Crawford Fund Conference as an important event that they should attend at least once. I am sure that there are many other benefits of the conference that I have not mentioned yet, and hopefully you, the future reader of my reflection, will find out by yourself.

Once again, I would like to express my gratitude to the Crawford Fund, sponsors, speakers and scholars for this wonderful experience that offered me a lot to learn, to think about, and to enjoy. Also, a big thank to RAID for organising the RAID networking trivia night and the Crawford Fund Scholar day, they are such beautiful memories that I will never forget.



**Joshua Philp, University of Adelaide**

**Mentor:** Dave McGill, University of Melbourne

I am grateful to the Crawford Fund South Australia Committee for their support to attend the 2019 Annual Conference as a Conference Scholar. It has been an informative and beneficial experience that I hope I can repay by furthering the Crawford Fund's aims of improving food security in my role as an agricultural scientist.

The conference topic, "Addressing the Agriculture, Energy, Water, Climate Change Nexus" was especially relevant to my interest in improving pasture production by smallholder livestock farmers in developing economies. The role of ruminant livestock in a future of increased food production and reduced greenhouse gas emissions is controversial, and the presentations during the conference included differing expert opinions. Several presenters proposed that the solution to the high methane emissions by ruminant livestock production was to vary human diets, thereby reducing demand and eventually production. In my own experience I have noticed a matching shift in community expectations towards reduced livestock production, especially in Australia, driven by environmental and ethical concerns. Conversely, grazing livestock is often the only source of income and nutrition available from marginal lands, and a pathway for the rural poor to escape poverty. Furthermore, presenters at the conference, discussed emerging technologies that reduce enteric methane production by ruminants, and there is also tremendous potential for carbon to be sequestered deep in soil by improved pastures that support ruminant livestock. It was valuable to mingle with some of the experts whose research and understanding may shape the future of my profession. It was also fascinating to hear talks on topics that I was less familiar with.

Regarding the experiences of being a Crawford Fund Conference Scholars specifically, it was really great to meet so many other passionate and talented people from the different states. The pairing of Conference Scholars with a mentor was very effective in terms of ensuring networking opportunities for the Scholars were not wasted. I really valued having someone at the conference who could assist me with introductions and help me identify delegates who I only knew by name. Perhaps irrationally, given how friendly everyone there was, it is difficult for me to approach people I don't know, especially when they are already in a conversation, but at a conference you will rarely catch someone by themselves. In situations like this I really valued having David's help, especially since he knew almost everyone there.

## TASMANIA

**Lucy Cooper, University of Tasmania**

**Mentor:** Tara McKenzie

I was fortunate enough to attend the 2019 Crawford Conference as a scholar funded by the Tasmanian Crawford Committee. I would like to thank the Crawford Fund for this opportunity and my mentor Tara McKenzie for her continuous support and guidance throughout the conference.

The conference centred around the term 'The Perfect Storm' which was coined by Sir John Beddington. He predicted that by 2030, scarcity of food, water and energy would lead to unrest, conflict and mass migrations and the aim of the 2019 conference was to examine if the 'storm' will still occur or if current practises and innovation will delay or lessen the impact.

The first day of scholar activities was a great opportunity to meet other scholars and mentors. It was an extremely beneficial day as it focused on the scholars and how we can better ourselves in the International Ag sector. It was wonderful to have a day that allowed scholars to receive insight on ways to get into international ag research, working in a developing country and what working in the private sector would be like. The chance to interact with speakers such as Aditi Mukherji who is the Principal Researcher at the International Water Management Institute through the means of Q & A was a wonderful opportunity to connect with industry leaders.

The Sir John Crawford Memorial address was presented by Professor Ross Garnaut AC. He spoke of the opportunity to have profitable, productive and sustainable farms that produce products that are of high quality, enhance food security and allow for carbon sequestration in depleted soils. While this is very much a possibility for the future, he noted that it would be up to all of us to come together and seize this opportunity as a nation. A theme that I felt ran throughout the conference was that change will not occur if we work alone. Each industry, each sector, each business, must work together to ensure sustainable progress in agriculture occurs.

It was refreshing to hear speakers such as Sarah Barker from Minter Ellison who delivered a sobering address stating that the climate is no longer changing, rather the climate has changed. The messages delivered throughout the conference were in a way conflicting to each other. Some speakers spoke about how we are on track for a climate Armageddon whereas others noted that things are looking optimistic in the realm of climate change. While this could have been frustrating for some, it should be seen as an opportunity for further research, work, and development in agriculture. Change is upon us and the role and power that young people already hold will be instrumental in the drastic requirement for change. If we do not act now, then we will reach a breaking point where food inequality,





environmental distress and economic uncertainty will dictate everyone's lives.

Crawford Fund Board member Professor Timothy Reeves perfectly summed up my take of the conference in his synthesis. He recommended that we need to change our outlook of our goals for the future and to do so we should say rather than 'produce more with less' we need to 'produce enough with less'.

**Faruq Shahriar Isu, *University of Tasmania***

**Mentor:** Neville Mendham, Crawford Fund Tasmania Committee

When I first learned about the 2019 Crawford conference scholarship, the title "Weathering the 'perfect storm' - Addressing the Agriculture, Energy, Water, Climate Change Nexus", immediately caught my attention. It had all the right keywords to pique my interest, given my background in environmental science and my current master's degree in agricultural science.

When I sat down with the application, I was a little disheartened to find out the eligibility limitation – as it holds true in most cases for international students. But, given my passion for the topic and the immense opportunity the conference would offer, I wanted to pursue it. I spoke to my thesis co-supervisor Dr. Beth Penrose, who supported and inspired me to contact the Tasmanian Crawford committee coordinator, Dr. Neville Mendham. I heard back from Dr. Mendham (who would later be assigned my mentor) quite promptly and he encouraged me to put in my application. Needless to say, when I got the acceptance email, I was thrilled.

The scholars' event on the first day was a great way to break the ice and meet other scholars and mentors. It was soon evident that there were people from a vast array of backgrounds which presented an immense opportunity for knowledge exchange. Later in the day, the Memorial Address and dinner provided good context and set the scene for the main conference.

The main conference at the Parliament House was impressively laid out and covered a range of interlinked issues. From a "gloom and doom" scenario to a "there is still hope" point of view, the key message was the same – we are almost at the tipping point, the time to act is now. It was unanimous that no one wants to see a 4 degree rise in temperature by the year 2100, but the varying views and standpoints brought forth during the Q and A sessions were outstanding. It was also interesting to see a presentation from a legal and finance lens, where the deterministic – worst case scenario perspective was used. This was unique and quite new to me and just went to show how different schools of thought can come together, albeit in different ways, to fight the same battle. At the end of the conference, I was left with the thought of whether more research should now focus on climate change mitigation approaches, rather than adaptation?

The RAID network event to end the day was the perfect way to unwind, have lively discussions and turn some new contacts into friendships.

The last day scholars' event was a good way to exchange our thoughts on the conference and learn about different opportunities that are present for budding researchers. It was also nice to hear about the challenges and experiences from people who were, not so long ago, on the same boat as us.

I would like to thank my mentor for his words of wisdom, encouragement and guidance throughout the conference process. I think the mentorship program is unparalleled in building confidence, gaining valuable insights and helping to make the right connections for the young scholars in attendance. I must also tip my hat to Cathy Reade and her team for so gracefully and elegantly running the conference, on top of handling arrangements for the 51 scholars in attendance, which I am sure was no easy feat.

Finally, my sincere gratitude to the TAS Crawford Fund Committee for granting me the scholarship and to the Crawford Fund for creating such a wonderful platform.

**Anna Mackintosh, *University of Tasmania***

**Mentor:** Harry Campbell-Ross, ACIAR

Sir John Beddington's prediction of a 'perfect storm' a decade ago set the theme for the Crawford Fund's 2019 Annual Conference, "Weathering the 'perfect storm': Addressing the Agriculture, Energy, Water, Climate Change Nexus". I was fortunate enough to be selected as a Crawford Fund Scholar for Tasmania to attend the 2019 conference, an experience I cannot speak highly enough of. The key message from speakers throughout the day was that without significant change, a global climate disaster will be upon us in the very near distant future.

The Sir John Crawford Memorial Address was appropriately presented in the Hotel Realm Ballroom by Professor Ross Garnaut AC, a former student and associate of Sir John Crawford. He highlighted the challenge of reducing the weight of our global footprint and the need for revolutionary science with the adoption of modern policies. His Memorial Address set the theme of the conference, being that by 2030, the 'perfect storm' will be upon us if we do not take immediate action.



The most memorable speaker was Professor Sir Charles Godfray, who presented the morning keynote speech titled, "Can we feed the world without wrecking the environment?". His speech referred to the three waves of Malthusian Pessimism and hence asked the question, "Is the perfect storm still on track to happen?". His answer was yes; however, I particularly admired the way Sir Godfray answered the question in such a positive manner, explaining our ability to make changes to address the third wave of Malthusian Pessimism. As an undergraduate studying agriculture in the midst of global climate change, it was refreshing to experience a more optimistic perspective and stressing the fact that we can still make change. This optimism was continued and highlighted throughout the conference by all speakers.

Professor Ross Garnaut AC and Professor Sir Charles Godfray are two of the many speakers who addressed and raised important topics surrounding international agriculture and weathering the 'perfect storm'. The opportunity to not only listen to such admired speakers but be able to ask questions as well as partake in networking sessions provided an incredible opportunity to further my connections in this space. As a student studying in my third year of a Bachelor of Agricultural Science degree, the conference highlighted the importance of working together to achieve global food security and the many opportunities for graduates in being able to contribute towards this great challenge.

The plethora of knowledgeable and passionate speakers, opportunities to meet other students and graduates with similar interests, and exposure to acclaimed eminent international public and private sector experts are several reasons why those interested in international agriculture and development should attend future Crawford Fund conferences. Professor Timothy Reeves concluded the conference with a synthesis and final thought that, "Instead of producing more for less, we should be producing enough for less".

The conference highlighted the fact that there is no simple solution to solve global food security and it requires the partnership of experts around the world to share their knowledge and resources to ensure global food security now and into the future. The enthusiasm and optimism of speakers and fellow scholars at the Crawford Fund Conference made me even more excited about international agriculture and the many opportunities that await me at the conclusion of my degree.

**Kai Peersman, University of Tasmania**

**Mentor:** Margaret Reid, Crawford Fund ACT Committee

My experience at the Crawford Fund Conference exceeded my expectations. It was a marvellous experience listening to inspirational speakers, learning about future opportunities in international agricultural development and meeting like-minded people from all over the country. On the first day it was welcoming to meet my mentor, Margaret Reid. She was very kind to me and always up for a chat in between presentations. John Anderson kicked the conference off with why international agricultural research is so important. Then, Dr Peter Carberry told us about his career as an Agricultural researcher and how to break into the field. Afterwards it was interesting to hear from two representatives of private companies Kelloggs and Bayer and what they had to say about what impacts the private sector has on international development. Notably, that the future of international development not only lies in the work of government or nongovernment agencies, as that the private sector also has an important role to play.

In the evening we went to the Hotel Realm for further networking opportunities and to listen to the memorial address of Professor Ross Garnaut. His address was particularly insightful in the sense that it provided an economic strategy to combat the perfect storm. Climate change could be mitigated through smart land use of agricultural land. Australia has a fantastic opportunity to step up its efforts of combating climate through the use of carbon farming.

The next day we listened to a range of keynote speakers. These talks were incredibly interesting covering topics such as climate smart villages in South-East Asia, fish passage design on the Mekong river and a climate resilient food-cube system.

Talks that particularly made an imprint on me were those made by Sarah Barker and Professor Sir Charles Godfray. Sarah Barkers talk about climate change through a finance and liability lens was notable because of the way in which the topic was presented. This talk showed me that clear communication about climate change to the private sector is possible. It could make a tremendous difference to persuade the private sector to invest in climate smart investments. Prof Sir Charles Godfrey elaborated his view on the challenges associated with feeding the world without wrecking it. His view was not utterly pessimistic, instead he showed that there is a way forward, granted that hard decisions are made. These decisions include revolutionising our agriculture, improving on productivity and sustainability at the same time.

On the consumption end of the spectrum, Professor Godfrey outlined how our diets need to drastically change and could be achieved through a plant-based diet with proteins sourced from insects.

The RAID networking event at the end of the second day provided a fun and relaxed environment to further get to know the other scholars and people involved in RAID. The quiz accompanied by drinks and snacks made for a good time.





On the final scholar day, we were fortunate to learn about ACIAR, RAID and volunteer opportunities. This provided a great opportunity to view presentations by people with experience in undertaking projects in development countries. The struggles they encountered, but also the fondness with which they were speaking about their experiences was simply inspiring and made me aware of the many opportunities ahead.

The whole scholar experience of the Crawford Fund has reinvigorated me to do well in my studies and pursue my ambition to seek a career within international development. For this I am very grateful.

**Olivia Woodiwiss, University of Tasmania**

**Mentor:** Suzie Gaynor, ACIAR

The Crawford Fund Conference was a fantastic platform to meet many people from different backgrounds, all with a common goal – ensuring food security and agricultural sustainability into the future. The scholar activities which initiated networking among peers, was a great way to learn about the potential pathways into agricultural research and development.

Looking over the attendee list, I was very overwhelmed with all the speakers and networking opportunities - so it was a relief to have a mentor to guide the way. Suzie Gaynor (ACIAR) knew all the people that I needed to know and went out of her way to make sure I met the people I was interested in meeting. On the Monday night networking dinner, I shared a drink with Professor Sir Charles Godfray after letting Suzie know I had watched some of his speeches before and found his knowledge very inspiring. I was apprehensive of what to speak with him about. Sir Charles was down to earth, and, surprisingly to me, interested in my thoughts and future aspirations! This was my absolute highlight of the conference, and I would not have had the opportunity without Suzie's 'push' of support.

Being able to speak with so many professionals helped me decide to take up an Honours project next year, after huge encouragement to pursue my aspirations. The RAID events gave the opportunity to speak honestly with other 'early career' individuals which allowed for true information sharing about the challenges and benefits of international research.

The Crawford Fund Conference ran without missing a beat, and it was fantastic to be a part of such a prestigious event for the organisation. Not only highlighting the circumstances that need change, but also identifying how these can, and are, being addressed. Sarah Barker triggered important points about the necessity of cost and benefit, when urging a dramatic shift in societies views, to encourage the need for change in our current circumstances that would ensure sustainability into the future. She acknowledged the initiative of private sectors who have been able to lead a change which they have inevitably recognised as 'valuable' by the consumer driving force. This highlighted to me, the overarching power of money and identified the need to combine the use of effective marketing and communication to promote foreseeable benefits for the entire globe. There is no 'silver bullet' to our nexus, but collaboration and sharing will be the key to effective change.

I am keen to keep in contact with the professionals and students that I met at the conference and through RAID. I have sent my 'follow up' emails from the business cards I was able to collect, and I have received a reply from every one of them – confirming that support, and reassurance, I have established for the future. I feel fortunate to have been able to attend such an informative conference which so closely aligns with my passion and continued learning. I am privileged to keep Suzie as a mentor throughout my study and career. I look forward to future opportunities that I have gained as a result of attending the 2019 Crawford Fund Annual Conference as a Crawford Fund Scholar.

I would like to thank the Crawford Fund Committee for allowing me to be able to participate in such an exceptional event. Without their financial support, I would have missed out on the inspiring activities.

## VICTORIA

**Nickala Best, LaTrobe University**

**Mentor:** Mike Taylor AO, Crawford Fund Board

The Crawford Fund Conference 2019 was a nice departure to my usual conference experience – I found it personal and gained different perspectives to what I am normally exposed to. Attending as a scholar, my favourite aspect was meeting my mentor, as this is what provided the personal aspect to the conference that you don't normally get. It was great to be able to talk to someone with so much experience and who was also very thoughtful. The time taken to talk to the scholars by the mentors is very generous and the events organised by the RAID network were valuable for both meeting peers and other mentors.

I particularly enjoyed the economics aspects that were presented and came away with more awareness of how the private sector is addressing climate change. It was clear to me that carbon sequestration is a viable new market for Australia, and an opportunity for primary producers to offset some of the carbon produced by primary industry, if the market was there to provide incentives. The impression I came away with was that the transition to a more sustainable mode of agriculture, and industry in general, is going to be driven through market risks and rewards from



corporations, to businesses that are trying to minimise the impact they are having on the environment. That seems to be the fastest way to enact change, through monetary incentives. It was great to hear from Rebecca Boustead, as an example of how you can create corporate behavioural change from within a corporation. This sentiment was seconded with the talk from Sarah Barker, who indicated there would be work for millennials in plastics companies (for example), should they want it. I felt these talks, combined with the implication that policy can be slow to respond to the climate crisis, made me think that if the right people become involved with the right companies, and maintain sustainable ideologies, change can be made quickly in the private/industry sector. As they are major contributors to the emissions that have contributed to climate change, it could only be a good thing. Another big take away for me was that responding to the climate crisis is inevitable, with industry, research and policy all being very important, but as Professor Sir Charles Godfray stressed, there will be people who are impacted more than others, and a compassionate and socially responsible attitude to these groups will be needed to maintain stability.

I met a lot of interesting people at the conference, as was exposed to information and ideas that I had not previously come across, which was exactly what I was hoping to get from the experience. I'm very grateful I was given the opportunity to attend as a Crawford Scholar, and came away with a sense of where I can put my efforts to help with the changes that need to be made.

**Lily Tran, LaTrobe University**

**Mentor:** Ted Hayes AO, Crawford Fund Victoria Committee

This year's conference theme was titled "Weathering the 'Perfect Storm': Addressing the Agriculture, Energy, Water, Climate Change Nexus". I had hesitations that this theme may not be relevant to my research, however within minutes of meeting scholars from all over Australia, I immediately realised that my concerns were simply me just overthinking.

Scholars were presented with two and a half days' worth of scholar activities, consisting predominantly of seminars in between the Parliamentary conference. The seminars complemented the main conference nicely, with speakers sharing advice and experiences in different aspects of agriculture. From each speaker, I was always able to gain key take away messages. My top 3 talks from the scholar activities in speaker order were: The Hon John Anderson AO, Prof Robyn Alders AO & Dr Aditi Mukherji who were all captivating speakers that motivated and inspired us all to contribute more to international agriculture, in addition to improving and striving to become a better researcher. These talks were further complemented at the networking dinner where I had the opportunity to speak with Dr Mukherji & Prof Alders. Each researcher was friendly, imparted great advice and was genuinely interested in the conversation at hand. This experience was humbling as I often feel that as a student, I don't really matter. However, having established researchers encourage and support my research was an empowering moment for me.

On conference day, I thought that the topic of climate change often incites pessimism. To my surprise most of the talks were surprisingly optimistic. The morning keynote delivered by Prof Sir Charles Godfray opened with a refreshingly optimistic view that a simple diet change is capable of changing the world, even in the face of climate change.

The optimism was further continued with Dr Mayberry's talk on reducing greenhouse gas emissions from red meat. As an animal agricultural researcher, I enjoyed listening to one of the few animal talks. She highlighted the immense reduction in greenhouse gasses produced by cattle in recent years and most importantly, stressed the importance of red meat production in developing countries. Lastly, my highlight and favourite speaker of the conference was Dr Phonekhampheng who delivered a captivating talk on fish agriculture along the Mekong river. He overcame minor language barriers and was by far the most passionate speaker of the day emphasising just how important fish are in South East Asian countries.

Through the Crawford Fund Scholar Program, I was able to experience a wide range of new and different aspects of agriculture that I normally don't get exposure to. I would also like to say thanks to my mentor Ted Hayes for volunteering his time and introducing me to some incredible researchers, some of which I now follow on Twitter. Lastly, thank you to the Crawford Fund for supporting me and allowing me to participate in the Scholars program.

**Antoinette Wichmann, University of Melbourne (FVAS)**

**Mentor:** Miriam McCormack, ACIAR

The 2019 Crawford Fund conference "Weathering the 'Perfect Storm': addressing the Agriculture, Water, Climate Change Nexus" and the complementary scholar program was an experience I will value and benefit from greatly.

As a veterinary medicine student, I was very interested in the role of veterinarians in international research as well as the impact the animals I will ultimately be providing medical assistance to, have on climate change. While the conference definitely had an agricultural focus more than veterinary, I was pleasantly surprised by the many vets that attended this conference. I think I was previously unaware of how many doors this degree opens outside of the classical clinical setting of the veterinary profession. I loved the ample networking opportunities on offer to get a more personal insight into the careers and paths the presenters had undertaken.





The scholar-mentor program was an invaluable part of the conference. I really appreciated having someone experienced and passionate about the future of our planet take their time to ensure I got the most out of the conference. The ability to meet other like-minded young individuals from all around Australia was another great aspect of this program and the introduction to RAID enriched these connections. The scholar-mentor afternoons, two nights spent with other scholars and RAID trivia night enhanced the experience of the trip tremendously.

The one-day conference at Parliament House was very insightful and uplifting. While I think there is a lot of work to be done to increase the survivability of our planet, the discussions, talks and questions answered during the day made me realise there are options and definitely progress in the right direction. Based on my veterinary focus I particularly found the talk by Dr Di Mayberry on “Raising the Steaks: Reducing GHG Emissions from Red Meat in Australia and Developing Countries” very interesting. We know nutrition plays a large role in emissions but applying this idea to animals and thinking about what affect the feed we provide cattle has on the emissions was a new thought process to me. I hope to see some more research and application of this in the foreseeable future.

The final presentation by Sarah Barker gave a very different perspective on how climate change has to be tackled and I think was a perfect way to end the conference. While yes there is a lot of research going into how to reduce emissions, utilise green energy, we need to be able to apply and sell these technological advances to businesses and corporations. Sarah Barker highlighted that money ultimately still drives most people – whether healthy for our planet or not. While she may have brought a more critical note to the theme of the conference it felt realistic and a call to look at all perspectives of climate action.

I am proud, honoured and grateful to have been part of the Crawford Fund scholar program in 2019 and hope to become more involved with RAID and the Crawford Fund in the future. Thank you for enabling me this opportunity.

## WESTERN AUSTRALIA

**Wesley Moss, University of Western Australia**

**Mentor:** Prof Lynette Abbott, Crawford Fund WA Committee

The 2019 Crawford Fund Conference did an amazing job of presenting the diverse and immense challenges facing the world, however the whole day still managed to resonant with a powerful sense of optimism. There were frequent mentions of Malthusian pessimism, but each speaker still delivered a message of hope. Yes, there are great challenges ahead for our planet, but we are capable of facing them. I left the conference feeling incredibly energized about my research in agriculture and excited to help meet the challenges of the future. To help weather the Perfect Storm by being part of a New Green Revolution.

The diverse range of presentations at the conference made it clear that there is no one solution to these problems, no “silver bullet” as Dr Mukherji put it. It was fantastic to hear about all of the different areas: from solar pumps, fish traps, cattle diets to vegetable gardens on Tuvalu. I definitely learnt a lot about completely new things and piqued my interest in a number of areas. In particular it was fascinating to hear about the number of issues we are now facing that are a direct result of the Green Revolution, highlighting the double-edged nature of all the progress we make.

Professor Godfrey’s morning keynote provided a fantastic introduction to the conference and Ms Baker’s afternoon keynote presented an intriguing perspective from the corporate side of the equation. It was a pity parliament was not sitting at the time, as the day highlighted the lack of policy leadership from our government, especially for a problem that requires such collaborative solutions.

The scholar days were a great addition to the conference and added immensely to the overall experience. Meeting the other scholars was a great opportunity to speak to people passionate about achieving the same goal but approaching it from completely different angles. The presentations opened my eyes to opportunities for research and international development I didn’t know existed.

Overall it was a fantastic experience and I hope to be able to attend as a mentor in the future to contribute to this great event.

**Riley Faulds, University of Western Australia**

**Mentor:** Jack Koci, Sustainability Research Centre, University of the Sunshine Coast

It’s a pretty well-worn question in agriculture: ‘In the coming decades, we’ll need to feed billions more people, with less land and less water; how do we do that sustainably?’ At the 2019 Crawford Fund Conference, we heard a number of potential answers to that question, from a number of the leaders of Australian and global efforts to feed the world sustainably. At the end of the Conference, I felt clarified, optimistic and impassioned about our odds of successfully addressing the Nexus, and about what roles I could play in Australia and internationally to contribute to the cause.

I’ve always been deeply interested in international relationships and how the international community function in meeting global challenges. For a while there, I aspired to be a diplomat, but found my way to agricultural science



through a love for rural landscapes, biological systems and sustainability. This Conference has exposed me to a range of avenues for combining agricultural knowledge, passion for sustainability and an international focus. As soon as I met my mentor, Jack, at the first Scholar Day, I saw how comprehensive the range of opportunities for international research and development really is. Jack was a young man but had already travelled around South-East Asia with the ACIAR graduate program and worked to build networks with RAID, while fitting a PhD in there somewhere too!

From the first session of that day through to the final speeches of the third day, we heard from amazing researchers, policymakers and advocates, whose career paths had taken them from places very similar to where we Scholars found ourselves, to countries across Asia, Africa, Latin America and elsewhere. These were the directors of international research institutes, leaders of aid networks, and individual researchers conducting fascinating projects in incredible places and they were all encouraging, realistically optimistic and willing to share their thoughts and knowledge on a range of topics and issues. Hearing an impassioned, authoritative speech about water scarcity in India and then discussing novels with the same speaker in a relaxed networking afternoon tea was an incredibly valuable experience for a student like me. I saw that the people who were leading the national and global push for sustainability, productivity and equality were knowledgeable and passionate, but pretty normal as well.

It was particularly inspiring to observe how these 'normal people' had dedicated their lives to pursuing research and development to drive positive change for sustainability and food security. They are up against immense challenges, which they were necessarily blunt about, but never lost an overall attitude of optimism in approaching. Hearing about the huge potential for carbon sequestration in Mallee regions, for urban food production, for smallholder farmers to improve production sustainability, excited me immensely. And learning how I can contribute to these efforts into the future is something that I hadn't really experienced in this depth before. My desire to pursue a career in agricultural research for a sustainable socio-productive future for Australia and the globe is stronger than ever.

**Isabella Suleski, *University of Western Australia***

**Mentor:** Tamaya Peressini, ACIAR

The 2019 Crawford Fund Conference was the first conference I have had the opportunity to attend, and it was a truly incredible experience. I am very grateful and privileged to have been provided with the chance to participate in such an event, especially as a second-year undergraduate student with so much yet to learn.

"Weathering the 'Perfect Storm': Addressing the Agriculture, Energy, Water and Climate Change Nexus" was a very apt name for this year's conference. Not only did it provide an exceptional insight into food and nutritional security measures being undertaken both within Australia and internationally, but highlighted the complex intersections between these key elements.

The morning of the conference was opened by keynote speaker Sir Charles Godfray, asking the pertinent question, "can we feed the world without wrecking the environment?" I found this session an extremely engaging and relevant way to begin, as with a keen interest in environmental conservation, it is a question I have often thought about. Sir Godfray explored this from a population biology perspective and called for a radical improvement of resource-use efficiency and sustainability. He admitted this to be ambitious, but thought it to be attainable, and his optimism and belief in causes for hope was a refreshing way to consider the future.

The conference speakers also provided numerous examples where measures undertaken in food and nutrition security have had positive impacts. Dr Ajay Mathur spoke of ways to increase and incentivise water use efficiency. One such intervention he described was energy-efficiency solar pumps for irrigation in India. Whilst solar pumping in this manner is yet to be incorporated on a larger scale, it is still an innovative means to reduce over-pumping of water and has potential to be implemented in numerous areas within and outside of India. Professor Alice Joan G. Ferrer described the Climate Smart Village initiative, and how it motivates communities to take action towards food security and agricultural productivity, whilst adapting to climate change. Climate Smart Villages have already been pilot tested in countries throughout South East Asia. It was uplifting to hear about these resourceful and creative means benefitting communities whilst being 'climate smart'.

To me, the insight provided by the conference was invaluable, giving me a clear idea of current and future areas of research that I could become involved with. Having Tamaya Peressini as my mentor to guide me through the conference proceedings and scholar activities further heightened the insight I was able to gain, as well as made the conference a very enjoyable experience overall! The networking opportunities and knowledge she provided was extremely beneficial, and as an ACIAR graduate she had a wealth of advice about where I could take my undergraduate degree in genetics. Being a scholar, I met many other young people passionate about all the factors within the climate change nexus. It was amazing to meet so many like-minded people from such a broad range of backgrounds and have the opportunity to network not only with the experienced speakers and mentors, but these other scholars. The experience of these few days was compelling, mind-broadening, challenging and incredibly inspiring, and I would highly recommend it to everyone!





## - EXTERNALLY-FUNDED SCHOLARS

### CENTRAL QUEENSLAND UNIVERSITY (combined reflection as an article)

**Emily Bryson - Mentor:** Lisa Borthwick, ACIAR

**Anita Milroy - Mentor:** Shaun Coffey, The Crawford Fund

**Sanjaya Timilsina - Mentor:** Kathy Dibley, Crawford Fund ACT Committee

[Grassroots solutions to the fore as CQUni reps engage at prestigious event](#)

As an increasing population faces limited resources, CQUniversity scholarship recipients have tapped into a prestigious national event which seeks to find workable solutions.

Postgraduate researchers Emily Bryson and Sanjaya Timilsina recently joined CQUni researcher Associate Professor Anita Milroy as scholarship awardees at the recent Crawford Fund Annual Conference in Canberra.

Ms Bryson is researching the potential for home composting of dog poo as a way to reduce faecal pathogens and plastic bag waste while recovering soil nutrients and organic matter for small-scale food production.

She said that climate change issues and the UN Sustainable Development Goals were prominent at the Crawford event.

"Messages that stood out were around evidence that our climate has already changed and that data from the past is not indicative of what is likely to happen in the near future," Ms Bryson says.

"It's becoming increasingly important to factor in the health of soil, water, production, animals, and people to ensure we all have enough nutritious food."

Ms Bryson said she particularly enjoyed having a mentor from the Australian Centre for International Agricultural Research (ACIAR) to help make introductions with relevant people.

"I have a number of potential collaborations to follow up, particularly around small-scale food production and the Planetary Health/One Health concept.

"I've already joined the RAID network (Researchers in Agriculture for International Development) and look forward to staying connected with the people I've met."

Associate Professor Milroy, a trans-disciplinary art, science, technology, engineering, mathematics and industry academic, said the Crawford [Fund] scholars were provided with a variety of opportunities, including networking for future collaborations.

"We were also provided with a mentor, and I was extremely lucky to have Professor Shaun Coffey as mine," she says.

"Professor Coffey has a history with CQUniversity and a wealth of agricultural and training knowledge that he was generous enough to share.

"I was impressed by the calibre of Crawford [Fund] Scholars and pleased to see young people proactively involved in innovative local, national and international agricultural industries and initiatives.

"It seemed very appropriate to be in the great hall in Parliament House listening to experts talk about how climate has changed and what we can do now and how to go about planning for a future which will be characterised by climate conditions which haven't been previously experienced.

"Professor Ross Garnaut's keynote on 'Weathering the Perfect Storm' was extremely thought provoking, and in particular his observations caused me to pause and think more deeply about what the future could look like, from both a local (Central Highlands) and global perspective.

"He noted there is immense potential for storing more carbon in the vast range lands of Australian, but that there is great uncertainty about the potential and what is needed to secure it, and that we need research to find the possibilities to maximise the value of production from this land."

Postgraduate researcher Sanjaya Timilsina, who is assessing the drought tolerance of spice and condiment crops, said he appreciated the chance for professional networking and felt blessed to have CSIRO scientist Dr Kathy Dibley as his conference mentor.

"The key message that stuck with me would be that it's not about 'climate change' anymore. Its 'climate changed' and we are already late, and our best hope could be to limit the global temperature rise to 2 degrees Celsius at the best," he says.

"The other thing that I noticed is that there is no silver bullet to solve these problems. It's mind-boggling to just think how much solar waste we will have in next decade without the proper mechanism in place to recycle or reuse solar panels.

"Also, it's ironic how sources of clean energy like hydroelectricity dams have been limiting fish migration along the Mekong river in Laos, leading to decline in fish output and causing risk of nutrition insecurity among poor fishermen families.



"The point is that nothing is a panacea. A new technology will for sure bring its own set of challenges and we have to be vigilant to keep on coming up with new ways to mitigate those problems.

"I also appreciated the story of how the Indian government was trying to promote LED bulbs and solar water pumps but was failing to gain momentum until the government approached the business sector and gave incentive and investment security for the businesses to promote these LED bulbs and solar panels. It has been a huge success.

"The business sector is the least thought of regarding the issues of international development efforts but my learning was how businesses actually are one of the biggest forces in making the change happen."

Source: CQUniNEWS, 22 August 2019

## CURTIN UNIVERSITY

**Duncan Wells, Curtin University**

**Mentor:** Gerard McEvilly, Aik Saath Program Coordinator, ACIAR

The Crawford Fund Conference was an extremely inspiring programme to attend, and I feel very privileged to have been given this special opportunity. I am forever grateful and must thank all who were involved in organising the event. The programme was well organised and extremely engaging, allowing me to be exposed to endless networking opportunities as well as being able to meet and listen to a diverse range of experienced professionals.

The first scholar day was a great success, I was able to meet with many like-minded scholars and mentors who all share an interest in achieving a reduced carbon emitting world, where agriculture is done sustainably and more efficiently. The evening address from Professor Ross Garnaut AC, was refreshing and very informative, summarising key aspects of where we sit globally in terms of addressing climate change. The need for global unity towards the matter was emphasised along with further commitment and investment required in scientific research to continue to assist in weathering the 'perfect storm'.

The Annual Parliament Conference was also a great success, with a series of well presented, diverse and informative talks relating to work that is being done in developing countries to help improve agricultural practice whilst significantly increasing efficiency. The spread of information and education is key to a global movement in sustainable agriculture, so it was great to meet research professionals who are on the ground and experiencing real life situations in developing nations. It is encouraging to see what great work is being done in a world where pessimism and negatively run large. The financial and liabilities address from Sarah Barker was also an extremely interesting perspective into how companies may be required to address climate change strategy into business modelling in the future.

The second day ended with a RAID networking event which was a lot of fun and gave us an opportunity to chat and network in a more casual scene which was the perfect end to a really beneficial day.

The final scholar day has filled my mind with many plans and ideas to try get involved in graduate or volunteer programs in developing nations. It was great to hear from people who had done significant work in similar such positions and how extremely full of life and energy they were. It was so encouraging to hear about all the work being done and how much of a positive impact it created in the local communities. I have left the Crawford programme a whole lot better off than when I arrived and would really recommend all my peers to apply for an opportunity next year.

## GARDINER FOUNDATION

**Natasha de Bondi, The University of Melbourne (FVAS)**

**Mentor:** Prof Robyn Alders AO, Crawford Fund NSW Committee

I felt extremely privileged to have been given the opportunity to become a Crawford Fund Scholar. With a background in Environmental Science and currently completing my final year of Veterinary Medicine I was particularly interested in the theme of this year's conference - 'Addressing the Agriculture, Energy, Water, Climate Change Nexus'. From the moment I first heard about the One Health concept – that human, animal and ecosystem health are inextricably linked, I have been wanting to learn more about these relationships. However, having spent the past six years focussing on my studies in veterinary medicine I have felt relatively withdrawn from the fields of environmental and climate change science. The Crawford Fund scholar program provided me with great reconnection and insight into the One Health domain and its inter-disciplinary approach was invaluable in broadening my perspectives on food security and global health.

The opening address by Professor Ross Garnaut AC explicitly portrayed the start realities of 'The Perfect Storm' facing global food security but also left me with a feeling of hope for the potential to turn around current trends and build on the many small positive changes occurring throughout the world. The conference setting in Parliament House served as a central reminder of the important roles that policy and social sciences must play in order to adequately address issues of food security. In addition, the scholar days allowed me to meet several young people working in





policy or social sciences. This allowed me to learn more about these disciplines and their importance in bridging the gap between narrow-focus scientific research and on-the-ground implementation of emerging innovations. I also found the session presented by Sarah Barker on the financial and liability aspects of climate change fascinating as it challenged me to consider the current climate situation from a completely different field of thought and reconsider many of my pre-conceived ideas.

The case studies presented by Dr Ajay Mathur on solar powered irrigation solutions in India and Dr Oudom Phonekhampheng on the construction of fish passes along the Mekong river to restore local fisheries illustrated how local initiatives can have significant benefits for both local and global communities. These speakers really inspired me to contribute to on-the-ground initiatives and get involved with local projects.

My mentor Prof Robyn Alders offered invaluable guidance on pathways into food security and global health as a veterinarian. Her wealth of experience in this field was tremendously inspiring and filled me with eager anticipation for my future career. As a soon-to-be graduate veterinarian the opportunity to meet with several veterinarians currently working in the food security area was instrumental in helping me to form early career goals that will provide me with the skills and knowledge required to make a valuable contribution to global food security in the future.

The speakers and activities on the scholar days provided a real sense of community with like-minded people and made me aware of wonderful organisations such as RAID and ACIAR. As I have a strong wish to become a volunteer upon graduating the focus on the many volunteering opportunities available in food security was extremely exciting for me and the first-hand accounts of previous volunteers' experiences confirmed my desires to become involved.

I left the Crawford Fund Conference full of inspiration and renewed enthusiasm to carve a path toward a career in food security and global health. I now feel more equipped to pursue this dream with the help of personal contacts, knowledge of key organisations and a sense of community amongst all those working in this important field.

**Josephine Ginty, *The University of Melbourne (FVAS)***

**Mentor:** Prof Shaun Coffey, The Crawford Fund

The Crawford Conference 2019 provided an incredible opportunity to be exposed to the cutting edge of agriculture. As a Crawford Scholar, I was privileged to listen and learn from the leaders of the modern agricultural revolution, and gain insight and guidance from the people and businesses that are already shaping the future of our world.

The key message of the conference was best captured, I think, in the opening address by Professor Ross Garnaut AC, who expressed an impressive breadth of knowledge of the many options for tackling the climate, agriculture, energy and water nexus. His optimistic conclusions set the tone for the rest of the conference, where case after case illustrated the leaps being made as climate smart agricultural practices are implemented around the world.

Indeed, 'climate smart agriculture' were the buzzwords of the day. This term, coined by the FAO in 2013, describes the process of increasing productivity, increasing resilience, and mitigating impacts of agricultural systems in order to prepare them for the future. Such practices have been put into action in projects like the Climate Smart Villages in South-East Asia and the Pacific, the improvement of genetics and resource use of crops in parts of Africa and Asia, and the increased access to water for crops with solar pumps in India. Such solutions utilise existing technologies and knowledge, and share them with the people who can use them best.

Larger scale changes were also a focus, with Professor Sir Charles Godfray FRS and Sarah Barker speaking about global changes that are pushing the modern agricultural revolution, despite the stagnation of government policy. I was inspired to hear about the United Kingdom's National Farmers Union's pledge to be carbon neutral by 2040, but disheartened of no such pledge existing in Australia. This feeling of inspiration and disappointment – a metaphorical one step forward and two steps back – dogged me for much of the conference.

In fact, despite the optimistic central theme, my personal take home message from the conference was far less inspiring. Not unlike Dr Oudom Phonekhampheng's fish, I got a sense that this modern agricultural revolution is a process of building steps for fish to climb up and reach their ponds, rather than tearing down the dams that trapped them in the first place. The absence of innovation in the climate smart principles is, in my opinion, a major oversight, and its absence was strongly felt in the reluctance of the conference to discuss long term changes in the livestock sector, impacts of intensified agriculture on biodiversity, and the social costs of climate and agricultural change.

I truly enjoyed my experience as Crawford Scholar and was provided with much food for thought to ruminate on as I continue my studies. It was truly a privilege to meet and hear from so many of the people at the forefront of the climate revolution, and I look forward to discovering the contributions I can make to positive change as I strive for sustainability in my career in the agricultural sector.



## GRAHAM CENTRE, CHARLES STURT UNIVERSITY (combined reflection as an article)

**Rebecca Owen - Mentor:** Bob Edgar, Southern Cross University

**Sunita Pandey - Mentor:** Shi Ying Yang, University of Adelaide

[Crawford Fund Conference: challenges perceptions, inspires change and connects students](#)

*What was the highlight of the conference?*

- The scholar program opened networks with a range of experts and other scholars in our research field. We especially loved initiating friendships with like-minded students and engaging in conversations about climate smart agriculture with a spectrum of intellectuals associated with the topic. We gained several great friends from all around the world, who we are sure we'll meet again in the future, whether it be through work or travel.
- Sarah Barker presented the most disruptive perspective of the day, discussing climate change risk through a finance and liability lens. I (Bec) didn't expect to engage so receptively with an economic approach. However, Sarah was one of my favourite speakers providing a very frank and realistic overview.
- The Networking Dinner on Monday night was another highlight for both of us. My (Bec) mentor Robert Edgar introduced me to many contacts who will be an asset to my career progression in the area of international agricultural research and development. I am very grateful for the assistance of my mentor throughout the conference, as well as his own advice for my future decisions.

*How has it changed your perspective on something?*

- During the mentoring, I (Sunita) changed my perspective on stress and worry. I learnt that worrying will never help a situation and I should approach things with a more positive attitude.
- The Crawford Fund Conference has broadened our perspective of climate change as a whole. In science, we are very often encouraged to specialise but our focus has been expanded as we have been made aware of how connected and holistic the food, water, energy and climate change nexus is. We now realise that every researcher should sometimes take a step back from their research niche and collaborate to tackle food security and environmental challenges together.
- The research of Di Mayberry and Sir Charles Godfray, as well as discussions initiated by audience members, have developed my (Bec) understanding of ruminant greenhouse gas emissions and consumption of animal protein. There are often two extremes in the debate, but rather than taking 'sides', we should all work together to improve our knowledge of sustainable food production globally. Godfray proposed that we should regain respect for the intrinsic value of food and alter our dietary behaviour to incorporate 'flexitarian' habits. Mayberry highlighted that Australian ruminant emissions have decreased from 21% in 2005, to 10% in 2016, suggesting that further reduction is entirely possible with the right support. We need policy makers and market drivers to get on board.
- I (Sunita) got a lot out of Godfray's comments on the Malthusian Pessimism and our need for a 'Double-green Revolution', following the historical Industrial and Green Revolutions. Godfray explained that a 'Double-green Revolution' would tackle both issues of food security and climate change.
- We learnt that the diminishing water level for irrigation is a significant global issue.

*What is the benefit for your research, current studies at CSU or future career?*

- The case studies brought a really relevant perspective to the table and made us think about current issues and how we can contribute to change.
- Networking opportunities allowed us to make connections in the international agricultural research and development field and opened doors to opportunities including internships, graduate positions, volunteer trips and future research projects.
- Interaction with other scholars and mentors has broadened our connections in the industry and opened communication pathways for future liaison.

*Has it inspired you to do anything?*

- The scholar program presented clear pathways into a career in international agricultural research and development. Personal discussions during the many networking breaks throughout the conference have inspired me (Bec) to apply for the ACIAR Graduate Program 2020.
- Keynote speakers have encouraged me (Bec) to consider my individual contribution to climate change. I have been inspired to review my dietary decisions and adopt climate smart behaviours.
- The conference has consolidated my (Bec) desire to be a part of research in global climate smart agriculture. I am considering eventually pursuing a PhD in the realm of reducing greenhouse gas emissions in ruminants.
- Firstly, it inspired me (Sunita) to think about current challenging issues such as climate change and to look on broader perspectives before designing any research. Secondly, it inspired me to work for people and focus more





on problem driven research. Thirdly, I was inspired by my mentor for her positiveness towards her research life.

- Rebecca - This conference was definitely a highlight of my degree. I thoroughly enjoyed the experience and it has significantly contributed to my self/career development. I went into the conference on Monday with a very hazy idea of where I want to go following graduation at the end of 2019 and left on Wednesday with a very distinct pathway. I was very nervous upon arrival on Monday morning as I knew nobody. However, over the few days I stepped out of my comfort zone to make countless friends and connections and am sure I will come into contact with many again in the future. The mentoring component was fantastic. I really appreciated Robert Edgar's efforts in forging connections and sharing his own experiences. So, thank you for my inclusion in your scholar program. It was an extremely valuable experience.

Source: Graham Centre Newsletter, Spring 2019

## PLANT HEALTH AUSTRALIA

**Joanne Lee**

**Mentor:** Helen Scott-Orr, Crawford Fund NSW Committee

We have all heard about climate change but take a moment to consider the agriculture, energy, water, climate change nexus. Not just one calamity, but multiple ones, building upon each other. The Crawford Fund's annual conference this year covered speakers and case studies dedicated to discussing this environmental interconnection. In 2009 Sir John Beddington coined the term "the Perfect Storm" and predicted that by 2030, food shortages, scarce water and insufficient energy resources would threaten to unleash public unrest, cross-border conflicts and mass migration as people fled from the worst-affected regions. The intent behind the 2019 conference was to reflect on this dire prediction.

The conference speakers, while describing the scientific issues we face, presented their facts in a positive and uplifting way. The unified story was that human endurance and ingenuity should prevail in the face of the perfect storm. And more importantly, the perfect storm is not coming, it's already here! Until politically we accept this, nationally we can't move forward. However, there is plenty already happening at a community level and with the developing countries Australia has partnered with.

The Sir John Crawford Memorial Address was presented by Professor Ross Garnaut who worked with Sir John in development economics. He provided an insightful talk making many references to his report presented to the Australian Prime Minister and Australian Premiers in 2008, The Garnaut Climate Change Review (Cambridge University Press 2008). He reflected that good policy has been poisoned by political discourse over the last nine years. That said progress in the electricity sector, mainly due to the renewable energy target, has provided some positivity in light of incoherent policy. Australia has exceptional resources for lower carbon energy and Professor Garnaut was hopeful Australia could emerge as the world's energy superpower. The memorial address was followed by the networking dinner.

The Annual Parliamentary Conference was held the following day. Personally, the highlight of the day was the presentation by Sarah Barker, MinterEllison. As a corporate lawyer she had a fresh perspective on why private companies, who are driven by money, already care about climate. Australian listed companies are following overseas models when it comes to considering climate change related risks in their governance, risk management and financial reporting. In short, they don't want to be fined by directors and auditors for not having a contemporary understanding of climate-related financial risks in line with the Recommendations of the Taskforce for Climate-related Financial Disclosures from 2020.

In addition to the conference I was lucky enough to be awarded a Crawford Fund Scholarship which enabled me to attend an additional two half days of activities either side of the Crawford conference. With the help of an experienced mentor I was able to mingle with like-minded individuals across a broad range of fields such as research, veterinary science, policy, science communication and engineering who all shared a passion for international agricultural development. In short, the discussions and networking broadened my view on agriculture opportunities and global climate security. Lastly, I am thankful to the Crawford Fund and Plant Health Australia for providing me with the opportunity to attend the 2019 Crawford Fund Conference.

## QUEENSLAND ALLIANCE FOR AGRICULTURE AND FOOD INNOVATION, UNIVERSITY OF QUEENSLAND

**Ritesh Jain**

**Mentor:** Michael Robinson, Plant Biosecurity Science Foundation

It was my great pleasure to get an opportunity to attend the 2019 Crawford Fund Conference in Canberra. The overall program of the conference, "Weathering The 'Perfect Storm' The Agriculture, Energy, Water and Climate Change Nexus" was exciting, encouraging and particularly inspiring experience as a PhD student.



The conference was packed with highly skilled experts in the field, a wide selection of researchers working on various aspects related to agriculture and climate change. It started with Professor Sir Charles Godfray's excellent talk on "Is the perfect storm on track to happen?" He began talking with global challenges – population growth, increasing food consumption, hunger and over-under nutrition, agriculture pressure, competition for land soil degradation, and water scarcity. He concluded his talk with some critical questions – what if we eat healthy foods? Can we adhere to the planetary resource boundaries for feeding global population? Obviously, we would see reduced greenhouse emission and increased economic benefits.

The following speaker Dr Bruce Campbell raised some mega mitigation challenges such as industry, electricity and heating, agriculture and transport. He also mentioned current agriculture system could only achieve up to 40% of what we required by 2030. To improve our goals, we need to scale up climate innovation and adoption to the 500 million smallholder farmers worldwide. The last section of his talk covered the possible solutions to transform our food system, where he mentioned, policy and institutions can play a significant role in bringing global change in current food system. The next speaker, Dr Ajay Mathur stated that increasing farm efficiency would be the critical solution for reducing the impact of climate change on global agriculture. He also raised the issue of temperature rise scenario and how to address this challenge by enhancing water, energy and fuel efficiency which can offer considerable benefits to the farmers.

Professor Timothy Reeves summarized the final thoughts by stating the most crucial challenge in coming years is food security. He concluded with a statement that sustainability is the future path, and policy cohesion and team efforts in taking decisions are most essential factors for changing global issues. Finally, Dr Colin Chartres concluded the conference with a final statement that global problems can be solved if we come together and do it together. On that note, it was pleasing to meet and see all keynote speakers not only addressed the current challenges with food, climate change, energy and agriculture but also shared some thought-provoking solutions for changing global scenario.

I firmly believe that I learned and benefited from the Crawford Fund conference and RAID's scholarly group activities and I would like to thank immensely for that. This conference was one of the first networking events I have attended, and my mentor Dr Michael Robinson encouraged me to ask questions, network with experts and students and guided me in right direction in such a foreign setting.

Finally, I would like to take this opportunity to thank everyone who helped, motivated, encouraged, and supported my presence at the conference and scholars networking events. I strongly encourage you all to attend this exciting and inspiring Crawford Fund Conference.

## RMIT

### John Humphrey

**Mentor:** Prof Caroline Mohammed, Tasmanian Institute of Agriculture

As an environmental engineering and environmental science student, learning that the 2019 Crawford Conference theme focused on "weathering the perfect storm", I knew immediately that this would be an incredible experience. I view minimisation of the global impact that humans have on the environment as essential in every meaning of the word, with agriculture, water and energy sectors playing a crucial role in catalysing change for the greater good. The conference was an unforgettable experience and one that I will reflect upon greatly in the future. It has helped to shape my views, encourage thought processes, direct personal research opportunities and drive home shared truths in quite a difficult global context.

The opening address from Professor Ross Garnaut set the scene for the remainder of the conference, thus it was a highlight for myself. He spoke truths, gave hard facts and addressed the issues of food security with a strained optimism for the challenges being faced globally, emphasising the application of well targeted and applied science. Garnaut highlighted the need for sound policy to be based on knowledge, research and education, touching on how the policy making process contributed to the task at hand. He delved into heritage and indigenous Australian cultural practices, asking questions and discussing the success and lessons to be learned in modern agriculture by placing value on heritage and treating systems as a whole. Renewable energy generation and sequestration in regional Australia were touted for the creation of a potential world leading low carbon economy, with land management transition a vital opportunity. As an experienced and well respected individual, Garnaut did not beat around the bush, he told it how it was and did not hesitate to admit the difficulties that climate change are having on the earth and societies already, again stressing the role quality research can play - a stimulating address for myself.

The Great Hall of Parliament House was abuzz the following morning, with the fantastic location accentuating the importance of the conference. However, the lacking presence of parliamentary ministers was obvious and personally disappointing, with policy driven change a recurring theme throughout the day.

Prof Sir Charles Godfray and Dr Bruce Campbell led the call for a change in human diet worldwide, reaffirming the





major recommendations of August's IPCC report. Dr Di Mayberry's discussion of the changes in red meat production acted as a great contrast, stimulating great discussion and thoughts. The fact that a healthy diet is available yet taken for granted in many parts of the developed world also struck a chord with me, with human attitude (at all levels of society) a driving factor for the cycle of over consumption, obesity, health, processed food, food demand, packaging, food waste, emissions and climate change.

Internationally implemented projects showed the use of climate smart villages and smallholder changes across Asia. Prof Alice Joan Ferrer discussing the sustainable future of rural agricultural communities and Dr Ajay Mathar and Dr Aditi Mukherji delving into the huge issues of groundwater, fertiliser and energy use in India. Dr Jim Woodhill from DFAT brought these projects together, highlighting the importance of decision making for smallholders, with long term thinking and restructuring to overcome before large scale implementation, of which I found very interesting.

Overall, I left the conference optimistic and eager for the future. Knowing that there is fantastic work being done in research within Australia and internationally gave me hope for a changing future, despite current governance and limited pressure from policy. On a different note, the importance of networking, discussion and asking questions were also lessons taken home from the Crawford Conference. The ability to be able to speak with clarity and undertake in depth conversations with a variety of audiences was demonstrated, providing me with the drive to partake in such events in the future, leave my comfort zone and become a more rounded and inquisitive individual.

## SOUTHERN CROSS UNIVERSITY

**Razlin Azman Halimi**

**Mentor:** Bec McBride, ACIAR

Overall, attending the conference was a good experience for me as my PhD project focuses on underutilised crops within the context of food and nutritional security. The conference covered a wide range of topics, all related to food and nutritional security, and kept within the focus of the agriculture-energy, water, and climate change nexus. Key messages from the parliamentary conference were that our climate has already changed, all sectors (agriculture, livestock, policy, international development) need to work together if we are to meet the SDGs. Although sessions were conducted with some formalities, Q&A held after each session were free, informal and welcoming. As a student, it is a great opportunity to ask questions to such established scientists and get feedback. The breaks (morning tea, lunch, afternoon tea, and networking dinner) did allow for good networking and meeting other researchers. Due to the efforts of Crawford Fund, all delegates were actively twittering where the hashtag #19cfconf trended at number 1 in Canberra during the Parliamentary Conference. This added an element of social interaction for delegates. As a student, this provided a virtual platform for interacting with fellow delegates and speakers.

I found Prof Godfray's talk particularly significant to the 'Perfect Storm'. Although some might conceive his talk as somewhat on the gloomy side, it showcased what has been achieved, and what needs to be done. I was especially excited that one of his slides showed that legumes need less land, water and resources for their cultivation. As someone who is studying legumes and always promotes their role for food and nutritional security, it was great to see someone like Prof Godfray represent this. I also found talks by Bruce Campbell relevant to what needs to be done to improve food and nutritional security. Farmer engagement is a topic seldom discussed, many do not realise their importance for food security, and biodiversity conservation. Marc Noyce from Biofilta presented a great example of how we can make a difference using a simple technology. Foodcubes and other similar innovations on the market have the potential to assist countries to become more self-sufficient for food and increase awareness on 'where our food comes from'.

The scholar program allowed me to meet fellow students from different disciplines such as veterinary sciences, engineering and resource management, and distinguished researchers in a friendly environment before the main parliamentary conference. There were about 50 of us, and we all bonded together quite quickly. After attending the scholar program, I am inspired to be part of the international agriculture research community. Never considering international development prior to attending the conference & scholar program, I have definitely changed my mind.

I would like to thank Southern Cross Plant Science (SCPS), Southern Cross University for allowing me to attend the conference. Hats off to Crawford Fund for organising an exciting conference - it is truly one of a kind!

## SUNSHINE COAST UNIVERSITY

**Zoe Bridge**

**Mentor:** Bec Cotton, RAID and ACIAR

The Crawford Fund Conference 2019 allows students emerging into the field of agriculture to engage with leading experts in the field and current studies. The Conference focus was on weathering and halting the perfect storm, through transforming food production systems, with focuses on crop sustainability, fisheries, food systems and solutions and looking at climate change through a financial and liability risk lens. Dr. Aditi Mukherji address at the



RAID networking event and the Crawford Conference, I found particularly interesting, as she stressed the importance of thinking globally whilst acting locally towards the drastic effects of climate change. Many of the other talks as well, demonstrated the importance of engaging with local peoples to create change, and implementing sustainable practices communities deem necessary to promote sustainability.

The seminars offered by the RAID network showed the diversity of the agricultural field tailoring to scholar's individual interests. Having the networking event in the same area, allowed myself to listen to every talk available to soak in the invaluable knowledge being provided.

The mentorship program created an opportunity to expand my knowledge about agriculture development whilst engaging with people and organisations making incredible impacts in agriculture sustainability and climate change adaptation. The overall experience of the conference was guided by the incredible mentors, my mentor, Rebecca Cotton, guided myself through the three days introducing myself to a diverse range of people from RAID, The Crawford Fund and ACIAR. Bec's knowledge of navigating the agriculture world I have found invaluable, as an ACIAR Graduate Research Officer, I was able to learn about all the incredible opportunities ACIAR and RAID has offered her in the last two years. In addition to this, discussions about a 'work life balance' was touched on quite a bit by other more experienced mentors, hoping to contribute ways to successfully navigate a career through the policy and global action nexus.

As a Bachelor of Arts Honour student focusing on climate adaptation in the Pacific Islands, my experience with the Crawford Fund Conference, allowed myself to engage aspects of the agriculture sectors, previously unknown. I am extremely grateful to be offered the opportunity from the University of the Sunshine Coast, to engage with so many passionate individuals in the fields of agriculture and climate change. The key message I took away from the conference is that, although there is already so much being done, there is still plenty that can be achieved. I plan to use the knowledge gained to help inform my studies in the world of social science that balances my passions for the preservation of human cultures and climate change.

### **Daniela Medina Hidalgo**

**Mentor:** Tim Reeves, Crawford Fund Victoria Committee

The theme of the Crawford Fund Conference 2019 was "Weathering the 'Perfect Storm': addressing the agriculture, energy, water and climate change nexus". The title of the conference already hints about the complexities and multiple dimensions of the challenges that food systems are imbedded in. The complex nature of the relationships between food production and the environment have been at the centre of my interest from a very young age. When I decided to embark in a career in agriculture, I was drawn to the field by a sense of urgency to explore new and better ways in which agricultural production could co-exists with environmental conservation.

I was born and raised in Costa Rica, a country in which agriculture plays an important role in the country's history and economic development, but also one that prides itself for its progressive environmental policies. This meant that since a really young age I was exposed to both sides of the story. The side that recognizes the vital importance of agriculture in the wellbeing and development of the population and the one that is also aware of the multiple negative effects agricultural production can have on the environment.

The conference presentations and discussions highlighted this dichotomy and underscored the need to carefully balance the multiple objectives that food production is involved in, so that it can be developed within existing planetary boundaries. One important aspect that was emphasized during the conference was the need to look at food production with a food system's perspective. This means including in the analysis all aspects and stakeholders involved in the production, value adding, distribution, consumption and disposal of food products. Also, the need to always look for "unintended consequences". A perhaps uncomfortable argument to listen to is the need to re-evaluate our consumption patterns and our food choices, as demand driven changes in food systems might be shaping our agricultural production well beyond those planetary boundaries. The conference highlighted the increasingly important role that the food industry, the private sector and the consumers have in pushing for the most drastic changes that need to occur and that Governments seem to be delaying.

The conference for me was a reaffirmation of the magnitude of the challenge of providing enough quantities and quality of food for a growing population in times where climate change already threatens life in some of the most vulnerable regions of the world. It seems like despite all the effort, resources and knowledge that has been dedicated for decades into research and development, they have been merely drops of water into an ocean of challenges. Yet, I was surprised to hear the positive messages and solution-oriented mentality of the more senior attendants of the conference. This was highlighted repeatedly throughout the conference. Including the two sessions for early career researchers in which the underlying message was how important the next generation of researchers are in solving these challenges and how exciting and rewarding is to be following a career in research for agricultural development.

I left the conference with a renewed sense of excitement and responsibility about my work. At times, the conference seemed like we were all preaching to the choir, in the sense that most people attending are already very aware of the





magnitude of potential consequences humanity faces, if we do not accelerate a radical transformation of our food systems. While we all seem to agree that we are facing massive challenges, there is more room for discussion on what the solutions might be and how these are to be implemented at different levels and in different contexts.

One of my favourite aspects of participating in the conference was the possibility to engage in conversations with my mentor. Having the opportunity to openly discuss about my future, my fears and aspirations about my career and how much we can really contribute, was extremely rewarding. This made me realize that despite how daunting the future might seem, the contributions from research and the work I am engaged in have the potential to help “weather the storm”.

## UNIVERSITY OF MELBOURNE, FACULTY OF VETERINARY AND AGRICULTURAL SCIENCES

**Emma Taylor**

**Mentor:** Dr Tony Gregson AM, The Crawford Fund Victoria Committee

As a second year Bachelor of Agriculture student I found that the scholar program for The Crawford Fund conference was a fantastic opportunity to learn and meet new people. The topic, “Weathering the ‘Perfect Storm’: Addressing the agriculture, energy, water, climate change nexus” provided detailed and expansive discussions about the challenges we face in the future of agriculture around the world. I learnt that there are a vast number of opinions and suggestions for the way we should approach this topic and everyone’s approach is slightly different.

From Professor Ross Garnaut we heard the motivating and encouraging Sir John Crawford Memorial Address. We learnt about the many opportunities available for improving sustainability while also maintaining high-quality productivity and profitability of our farms. Over the next day, we heard from others who shared that positive outlook such as Prof Sir Charles Godfray and Dr Bruce Campbell. On the other hand, we also heard from some speakers who had a more pessimistic view on the future of our agricultural industry. From Sarah Baker we learnt a pessimistic economic point of view, where climate change has already begun to impact.

Between these strong positive and negative outlooks, we heard some relatively smaller and more specific examples of programs and activities being undertaken to improve sustainability in agriculture in the long term. We heard from Dr Ajay Mathur, Dr Aditi Mukherji and Dr Oudom Phonekhampheng, who spoke of the unintended consequences of past actions taken to increase crop productivity in India and also the fishing practices along the Mekong river. From others, such as Prof Alice Joan de la Gente Ferrer who spoke of Climate Smart Villages, and Angela Manjichi’s presentation presented by Dr Eric Hunter who spoke of the SIMLESA project, we learnt about some of the new community-sized actions being undertaken. Further, we discovered new technologies being used for small scale agriculture such as the Biofilla Foodwalls in the South Pacific that Marc Noyce spoke about.

In addition to being given the opportunity to learn from the speakers throughout the three days, we, as scholars, were also provided with a mentor who gave us further opportunities to meet people in our areas of interest. Having access to a mentor gave each of us someone whom we could ask questions of and receive advice from. I feel very lucky with my mentor, Dr Tony Gregson, who gave me the chance to meet a vast number of people. Not only this but he also provided me with a familiar face that I was able to easily seek out and ask any questions I wished to ask.

I am very grateful for this amazing opportunity to learn about and meet the many different types of people and their approaches to our combined challenge towards continually improving our practices for a sustainable future. I have been inspired to change the way I think about the things I am studying, and how certain practices could be improved to make them more sustainable in the future.

## UNIVERSITY OF NEW ENGLAND

**Sajanee Hene Kapuralalage**

**Mentor:** Stephen Ives, Crawford Fund Tasmania Committee

I am very grateful to the University of New England for giving me this opportunity to attend the Crawford Fund conference 2019 held in Canberra in August. It was a great platform for networking experts in different aspects of agriculture.

The scholarship and mentor program were the key to encourage the younger generation in sustainable agriculture for development. I was fortunate to have a mentor, Dr Stephen Ives, lecturer, the University of Tasmania who had a background in both agriculture and environmental sciences.

There were heaps of events under scholar program encouraging us to be a part of agricultural research and development activities worldwide. It would be a great opportunity for international students who engage in the agriculture sector to be aware of new technologies and policies regarding the development of world agriculture and networking people.



## **Abdur Sarker**

**Mentor:** Alex Campbell, Crawford Fund WA Committee

I was thrilled by seeing how the world faces the challenge to meet global food security. I learned about advancing research in agricultural sectors by attending the Crawford Fund 2019 Scholar Conference on “Weathering the ‘Perfect Storm’: Addressing the Agriculture, Energy, Water, Climate Change Nexus.”

The conference covered range of key topics notably how developing countries are struggling to advance their agricultural sectors e.g. increase crop production etc. through research and innovation, and how developed countries like Australia can provide support through research exchange and collaborations. The day-long conference at Parliament House provided me with background to ongoing research activities in developed countries with agricultural perspectives and how these activities benefit farmers in developing countries. The speakers addressed the emerging need to balance resource use (e.g. land and energy) for food availability with climate change impacts. As a research student of Environmental Science, I would have appreciated hearing more about how researchers in agriculture are planning to better manage the environment and lower the negative impacts of agricultural activities which are a leading cause of climate change.

Several speakers grabbed my attention; especially Aditi Mukherji who highlighted a coordinated action to tackle climate change in order to simultaneously improve land, food security and nutrition, and help to end hunger. I particularly liked the idea of ‘Green Farming’ by Ajay Mathur of using the technology of solar energy instead of fossil fuels as an alternative source of electricity in agricultural production, which helps farmers in developing countries where there is a scarcity of electricity. The concept of Climate-smart farming in Southeast Asia is an excellent approach as this guides farmers effectively for sustainable development in food production and ensures food security in a changing climate. I think that the technologically advanced tools developed by ‘Biofilita’ for urban farming at low cost with greater accessibilities will accelerate farming activities among city farmers. However, I feel that besides financing research in agricultural development, there is an undeniable need to fund the climate change risk.

Mentoring was an important part of the conference as this facilitated the conference theme and allowed me to connect with scholars and researchers from diverse backgrounds. My mentor Alex Campbell, who has a wealth of experience with farming in Australia shared his valuable knowledge and suggested that I network with people of similar interest to me. The networking event by RAID was another exciting part of the conference which engaged me with their creative activities of volunteering and collaboration in research and allowed me to meet other scholars doing excellent research. Open discussion and group activities during the scholar day really helped to understand the variation in scholars’ thinking. The stories of voluntary activities in developing countries were amusing and inspiring.

I am grateful to my supervisor, Debbie Bower, for nominating me for the conference and for providing the opportunity to obtain experience from the diverse community of agricultural research in Australia and worldwide. Special thanks to the Crawford Fund team for their continuous support throughout the conference to be a part of the amusing and enthusiastic scholars, researchers and to meet the greatest minds. I thoroughly enjoyed the conference which broadened my thought and capacity, filled me with inspiration and really pushed me to think about how to tackle the future challenge of global food security and combat issues in climate change for a better world.

## **UNIVERSITY OF QUEENSLAND**

### **Hayden Morris**

**Mentor:** Joshua Bishop, WWF

It was my great privilege to attend the 2019 Crawford Fund Conference through the sponsorship of the Schools of Agriculture and Food Sciences from the University of Queensland. This conference was a tremendous experience both for professional and personal growth and I would highly recommend it to anyone who is interested in the field of international agricultural research. The conference was attended by a range of interesting and insightful industry members all of whom had something unique to discuss about their experience in the international agricultural industry.

In my final year of my Masters of Agribusiness, I came to the conference already aware of the issues that the world will be facing in the next century however with an overwhelming sense of misdirection in where and how these issues were to be managed. Through my time at the conference, I discussed this idea with a range of industry professionals and scholars, all of whom with different perspectives and words of advice for my journey to address these issues. These were further addressed during the Scholar Days and the conference itself where I was confronted with perplexing discussion and insight into the industry.

Key discussion included that contributed by Sarah Barker, Tim Reeves and Dr Aditi Mukherji whom all discussed the current state of the industry and the importance of grass roots participation in both the research process and industry engagement.





A key message that resonated with me was discussion regarding 'not creating more with less, rather creating enough with less'. This point, in my opinion really summed up the entire conference and the experience that I had, identifying that there is no longer a feasible way to continue agriculture research unless a sustainable approach is adopted. This is something that I will keep with me and continue to identify throughout both my career and personal life.

Finally, it must not go unsaid the important role that my mentor Dr Joshua Bishop had in making this conference an enjoyable experience. Joshua's input during the conference inspired me to step out of my comfort zone and converse with a range of industry professionals, many of whom I would not have through to introduce myself unless Joshua identified the commonalities we shared. I recommend to anyone who attends the Crawford Fund Conference as a scholar in future years to take full advantage of their mentors for both professional and personal mentorship.

I am grateful for having this opportunity to attend the conference, not only for the fruitful discussion I was involved with from a variety of stakeholders but for the industry and personal connections that I made which will only benefit my career as it progresses.

## **Sohraab Singh**

**Mentor:** Julius Kotir, CSIRO

To begin with, I was fortunate enough to be invited to attend the 2019 Annual Crawford Fund Conference as a scholar which I consider a spectacular opportunity that has helped to improve my knowledge and broaden my experience in the field of international agricultural development. The theme of this year, "Weathering the 'Perfect Storm' – Addressing the Agriculture, Energy, Water and Climate Change Nexus" was based around the food and nutrition security interaction along with the threat the global food production system faces as a result of climate change. The discussions urged policy makers, farmers and scientists to reshape strategies in order to improve the nexus between food, health and agriculture.

As a third year Agricultural Science student seeking to pursue honors, the Crawford Fund Conference provided me with an apt platform where I could hear about and discuss the various career opportunities and pathways in my area of specialization along with networking with like-minded scholars and lead researches. Interaction with my mentor and other scholars was truly enlightening as I had the opportunity to meet and speak with colleagues pursuing the similar path to myself which enabled insightful discussion.

In terms of the conference, one of the most interesting aspects was the focus on international development and food security along with rampant exploitation of natural resources. In particular, I was completely in awe of the presentations given by Prof Sir Charles Godfray and Dr Aditi Mukherji. Sir Charles highlighted the need to understand the population trend through the Malthusian lens and the difference one could make to the environment just by tweaking our diet and lifestyle. The importance of considering context when developing management systems and global goals was pertinent as well as using non-partisan approach towards addressing such issues. I believe that we are at a critical conjecture where the meat consumption has had a larger environmental impact and footprint but on the other hand, halting livestock production worldwide in response to that without recognising the contributions it makes to reducing poverty in developing countries cannot be ignored. It was also astonishing to learn about the emerging threat human faces from obesity and over-nutrition of food than from hunger and under-nutrition.

Furthermore, a theme explored throughout the conference that I had not previously looked into in depth was the diversification of our food systems and the Mega Adaption Challenge by Dr Bruce Campbell. Bruce Campbell highlighted the danger we face with the ever-changing climate and how a spike of just 4°C global average temperature can cause irreversible detrimental damage to the earth as a whole. He discussed important aspects such as how climate risk drives poverty and the fact that food system if changed can significantly improve a lot of factors affecting the environment. Prospects of developing heat and water tolerant varieties of crops and use of efficient technology was also discussed.

Dr Ajay Mathur from TERI also contributed by providing invaluable inputs and innovative ideas such as using solar powered irrigation as a form of "Remuneration Crop". Both of these presentations were highly informative and shed light on the potential future of our food systems. Learning about the various organisations to initiate involvement was extremely useful as a first-year student with much more to learn and experience.

Overall, I can say with a doubt that the Crawford Fund Conference has been the highlight of my year and I gained some wonderful experiences that I thoroughly enjoyed.

The opportunities and the ideas have broadened the horizon for me after engaging in some thought-provoking discussion with many world leaders in the field of agriculture that further fuelled the passion in me. If given a chance, I would attend this prestigious event again without a second thought and would hope to contribute in it with more experience, innovative ideas and a lot more inquisitiveness. In the end, I would like to extend my gratitude to the Crawford Fund organisation and the University of Queensland for this incredible opportunity.

