Crawford Fund FOR A FOOD SECURE WORLD

WEATHERING THE 'PERFECT STORM'

Addressing the Agriculture, Energy, Water, Climate Change Nexus

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Keynote Listeners' report

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Researchers in Agriculture for International Development (RAID)

Introduction

Sir John Beddington's prediction of a perfect storm, a decade ago, set the theme for this year's Crawford Fund Conference. Fittingly, the Sir John Crawford Memorial address was presented by **Professor Ross Garnaut AC**, a former student, and colleague of Sir John Crawford, who spoke of Australia's global role as the engine room of the low-carbon world economy. He highlighted the challenge of adapting to weakly mitigated climate change. In order to reduce the weight of our global footprint we need coordinated and context-specific policy development and science innovation. His address was the underpinning of the conference, with the speakers all united in the message that without significant change a global climate disaster will be upon us.

Professor Sir Charles Godfray, in his morning keynote asked, 'Is the perfect storm still on track to happen?'. And the answer was 'Yes', but he was more positive about our ability to make changes to address the third wave of Malthusian pessimism. The coming challenges – growing demand, hunger and over- and under-nutrition, agricultural pressure and water scarcity – will see more frequent climate and geopolitical shocks. Which led him to ask, 'What if we ate healthily and adhered to planetary resource boundaries to feed the increasing global population? What would the outcome be?'. Ultimately, we would see reduced nutrition-related deaths, reduced greenhouse gas emissions, and increased economic benefits, but to do so we need to look at the effects of both our food production systems and our food consumption patterns. Sir Charles stressed that there needs to be another Green Revolution that takes into consideration the environment in its delivery to avoid a global crisis. Our mid-term food security goals need to be achieved at a pace that has never been seen before to feed the world without destroying the environment.

Weathering and halting the perfect storm: food system solutions

The theme of transforming food production systems was continued by **Dr Bruce Campbell**, who addressed the mega food challenges faced by the global community. He stated that farming as we know it will not be feasible under the current system. Climate change is already with us, and this reality was made clear when Dr Campbell highlighted that we only have 11 growing seasons left to reach our Sustainable Development Goals by 2030. Current agricultural technologies can only take us part of the way to achieving our goals, so we need to scale up climate innovation, adoption, and change, particularly to the 500 million global smallholder farmers.

This is a written report by the 2019 'RAID Keynote Listeners', summarising key messages from the conference. The RAID Listeners are part of the Crawford Fund's RAID program (Researchers in Agriculture for International Development) – a network of early- to mid-career researchers with an interest in agriculture and international development.

Through climate-smart villages (CSV), **Professor Alice J. Ferrer** provided examples of how climate-smart agriculture is being integrated into existing farming systems to transform smallholder farming food systems. By generating best practice evidence, CSV are seeing change at the local and national scale. This provides evidence for policy-makers at the local and global levels to act.

The use of policy to enable change was discussed by **Dr Di Mayberry** in the context of considering multiple dimensions of red meat production to reduce greenhouse gas (GHG) emissions. In the Australian landscape, emissions can be reduced through whole farm system approaches in feed, vaccines and energy inputs and improved efficiency of production and land management. In the developing context, millions of smallholders rely on livestock for food, income, and labour, and she stressed that such changes need to be context-specific. Dr Mayberry also echoed Dr Campbell's thoughts that there need to be GHG reductions in all farming sectors to achieve our goals.

Crops, drops and the climate challenge: configuring the perfect storm

The impact of climate change on agriculture is complex, and in reference to Sir Charles Godfray's keynote **Dr Ajay Mathur** stated that we do not have many options as we move into the third Malthusian wave. Enhancing farm efficiency will be the central solution. Dr Mathur talked us through configuring the perfect sustainability storm to maintain our climate at a 2°C rise scenario. This would entail enhancing water, energy and fuel efficiency; developing the technology to move toward electrification; and addressing the cost and most importantly the adoption at scale by farmers.

Expanding on the concept of farmer incentives for adoption, **Dr Jim Woodhill** highlighted the need for cross-institutional dialogue to make transformational changes in farming systems.

In his case study on the Lower Mekong Basin, **Dr Oudom Phonekhampheng** gave an example of finding solutions for fish passage under infrastructure development in the Mekong, and the interaction between scientific research, engineering innovations and people to create change was emphasised. Neighbouring countries are now looking to adopt Lao research findings in relation to dam design.

It was evident from these talks that by breaking down silos in the context of policy, institutions, countries and regions, there is a strategic global approach for transformation that can be implemented.

Circular food systems and solutions: addressing the nexus issues

Dr Aditi Mukherji spoke on addressing these nexus challenges in South Asia. She called us to think globally whilst acting locally. She described the drastic effects of global warming in the mountains and glaciers of northern India and their implications for water availability and management. She highlighted two major studies. The first on the melting of glaciers and the effect this has on downstream communities. The second on groundwater over-exploitation and unsustainable tapping. These two studies highlighted the challenges faced by

The conference audience in the Great Hall of Parliament House, Canberra, during the Crawford Fund's 2019 Annual Conference.

communities as temperatures increase, particularly at higher elevations where increases are occurring at an accelerated rate.

Dr Mukherji's address was followed by a supporting case study, demonstrating how nexus issues are being addressed. **Marc Noyce** from Biofilta, a private company, outlined how they are supporting the growth of urban farming under space constraints. The company is now working towards translating the success of a low-cost low-tech urban farming system in Australia, to Tuvalu. This implementation of climate resilient food growing systems in the form of raised garden beds unravelled three main challenges for island food production: the lack of top soil, water access issues, and compost production.

Unfortunately, technical difficulties prevented a video link that would have allowed Dr Ângela Manjichi, in Mozambique, to address the conference.

Climate change risk through a finance and liability lens

Ms Sarah Barker, the afternoon keynote speaker, gave an alternative perspective on this complex nexus. Ms Barker spoke about climate change from an economic liability position, and made it clear that business has already taken climate change into account. She stated that climate change is already here; we can't plan for climate change risk, as it is already happening. She identified the power of the stakeholders, their values and their changing perceptions. Ms Barker concluded by stating that leadership in this nexus issue needs to come from business, communities and individuals, with the hope that the government will support with policy.

During the final panel Q&A of the day, **Sir Charles Godfray** explained that we are moving into a world where past data doesn't really tell us a lot about the future. This statement was followed by comments from **Sarah Barker** that companies are looking at their risks and mitigating them before their governments.

Final thoughts

Professor Timothy Reeves provided a succinct conference synthesis reinforcing that the greatest challenge for us in the coming decades is food security. However, he deduced that the overriding message is one of optimism, but not

with business as usual. He concluded by reminding us that sustainability is a moving target, that there is a need for policy cohesion and decisions cannot be made in isolation. Professor Reeves left us with one final thought: we usually say 'produce more for less'; perhaps we should change this to 'produce enough for less'.

Dr Colin Chartres gave the closing remarks, stating that this is probably the biggest challenge we are going to face in the next 20–30 years. If we are going to solve this, we need to do it together.

Madaline Healey is a member of the RAID Networking Executive, a Crawford Fund mentor in Laos and a former Crawford Fund conference scholar. She studied a Bachelor of Agricultural Science at Melbourne University and a PhD in thrips ecology at CQU before heading off to Laos as a volunteer and then mentor in our plant pathology and mentoring activities there. On returning to Australia in 2015, Madaline started working at the University of the Sunshine Coast on ACIAR projects in Laos, Cambodia, Thailand and Vietnam. Her interests are integrated pest management, biological control and all things veggies.

Rebecca Cotton was a Crawford Fund conference scholar from the University of the Sunshine Coast in 2016 and went on to be a Graduate Research Officer at ACIAR based in Canberra and an active RAID member. Bec's B.Sc. majored in sustainability. She then completed her Honours thesis on improving agricultural extension based in Fiji and the Cook Islands, with three months in the Islands conducting research with the subsistence and smallholder farmers.