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CELEBRATING AGRICULTURE FOR DEVELOPMENT

Outcomes, impacts and the way ahead

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Editor Ann Milligan

A CONVERSATION FROM OUTSIDE AGRICULTURE

Looking to the future

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Moderator: The Hon John Anderson AC

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Moderator: John Anderson

This conversation promises to be a very interesting session. It will follow a pattern used in my own podcast series of conversations with people who are outstanding in their fields: I will simply try and trigger a stream of consciousness from each of these three guests so that they can say the things that they think are most relevant and important.

I am going to start the conversation by reflecting, Allan, on your enormous global experience over many years. You told me over afternoon tea that you have been very interested in hearing what has been said here: the importance of the work that is done; the significance of international agricultural research; of extension; of lifting people into better living planes around the world. I think it's fair to say that all of that has been possible since the end of the Second World War because of the relatively enlightened leadership of the United Nations, particularly headed up by America. Broadly speaking, our friends may irritate us at times, but they have been playing good cop, opening trade routes, keeping them open, globalisation if you like, ending the days when nations squabbled, refused to export their own oil. Andrew Campbell mentioned that a good policy might include encouraging countries not to export their food, but up until the Second World War many countries put bans on the export of their oil – and there were terrible results from that. In short, America has played the good cop but they are now under great challenge from without and from within. How important do you think their role has been, and is, and will they continue it?



Allan Gyngell

Today's discussion really has been wonderfully revealing and rich. It has been very interesting hearing about the challenges facing the Crawford Fund, ACIAR and the other organisations.

About the United States: we were fortunate at the end of the Second World War when the 'right' side won. The 'right' side, remarkably, had a series of brilliant diplomats and political leaders and statesmen, some of them Australian, who recognised that it was important to learn the lessons of the post-World War I era. The first lesson was that the United States needed to remain involved in the world. Lesson 2 was not to humiliate the defeated powers but help them grow again. And lesson 3 was to set in place a global structure which was universal in its membership of the United Nations but still took cognisance of power through the structure of the Security Council. It was liberal in its value system – the

convention on the Universal Declaration of Human Rights, for example. That is, traditional liberalism infused with liberalism in the economic sense as well – free and open trade. And the US could do it because in 1946 it controlled about 50% of global GDP. So, no argument. It had the resources to encourage countries to join the system and abide by it, and to itself take on major responsibilities for tending the global commons. The result was what we have seen.

Think back to Jenny Gordon's slides today – the one (her Figure 3) that showed from the 1500s onwards a series of absolutely flat lines and then suddenly, at the time of the industrial revolution, the world discovers the whole new idea of 'prosperity', and the lines start going up. Then, after World War II, we see a huge climb. At that time, Australian GDP per capita in constant dollar terms rose from \$20,000 to \$60,000, and world GDP rose from about \$3000 to \$15,000. A number of the other human indicators went up also, such as life expectancy, which went up by 20 years in the least developed countries as well as the developed countries. That was excellent.

If you had given an Australian audience a blank sheet of paper in 1947 and asked them to design a system that would suit us perfectly, you would have come up with something exactly like this, where our closest ally was the most powerful state on earth, and the system which that ally supported and underpinned enabled us to draw on our deep economic complementarity with North Asia to grow our economic relationships, first with Japan – it's worth noting Sir John Crawford's role with John McEwan in the Commerce Treaty with Japan – and with South Korea, and then China.

But this was too good to go on, in some ways. Things happened, and you can argue about precisely what those things were, but the way I think of it is that around the time of the global financial crisis, the two countries of most importance to us – United States and China – both ceased to be status quo powers. They both decided at around the same time that something needed to change.

For the Americans it was a recognition that after a long haul they were not getting the returns they thought they deserved on the investment they had put into the international system. Donald Trump was the manifestation of this, but not just Trump alone: you can see it in some of the policies of President Obama and in President Biden's 'foreign policy for the middle classes'.

On China's side, there was the election of Xi Jinping and their feeling that they were now the second largest economy in the world, no longer satisfied to be a stakeholder in someone else's system; wanting a greater say in how the world operates.

That is where we are at the moment, and it is immensely difficult. I don't believe this is a more dangerous time than any other in Australia's history: there were parts of the Cold War that were very dangerous as well. But it is certainly a more complicated time than any other, and the Crawford scholars here today – who will be the decision-makers in industry and the country in 20 years' time – are going to have a much harder time of it. People like me were operating in the early 1990s, and that was an easy time. The Cold War had ended, and globalisation was in full swing. Not hard. Now it's hard.

Moderator: John Anderson

Thanks, Allan.

I want to make an observation to the young scholars who are so important to our future: Broaden your horizons whenever you can, and remember Churchill made the observation that *'All you need to know about statecraft can be learned from history'*. We undervalue history. Allan has just given this snapshot of why it is so important to understand the background, so that we know what is worth defending and seeking to preserve.

Now a question to Kylie. I think we have all been a bit gobsmacked by the reality of the enormity of the challenges before us, including in maintaining and taking forward research and development in agriculture. Do you have a stream of consciousness you would like to share with us, on what research and development for the future should look like, given that so many of the issues confronting us now are not industry-specific or short-term, but rather look to be much longer term.



Kylie Walker

I think we're facing multiple system challenges at the moment. It is not just climate change; it is not just the changing geopolitical forces. There are also questions of infrastructure transformation. We've got questions of skills and workforce development, which is becoming a growing problem, not just in Australia but around the world. And, of course, our investment system – certainly our government investment system, and also our private investment system for R&D – is probably not where it needs to be right now to support us to grow and to really innovate for a future-focused transformation that's sustainable and nurturing for our society, both domestically and globally. So yes, just a few things to tackle there at once!

Those multiple challenges present an opportunity to think in very different ways about how we configure our systems – our systems of funding, of skills development, of R&D, of infrastructure – and to think about integrating the way in which we arrange those things.

We might, for example, look at weaning ourselves off the short-term political funding cycle for government-funded research, because really there is no reason why we cannot commit to 10- or 20-year research programs and give that stability to our system, where we know that we are losing so many excellent people because they don't have job security. They are spending up to a third of their working year applying for grants and justifying their existence. What a phenomenal waste! I think we can think differently about that.

There is an opportunity for a visionary government to lay out a 'moonshot', if you like, for the next 10 or 20 years and say they are going to significantly 'shift the dial', on R&D generally, and on food sustainability and nutrition sustainability particularly, because that is a fundamental basis for society and a fundamental human right as well, and if we don't get that right then none of the rest of really matters.

The other thing that I am thinking about a lot at the moment is: how do we bring together the threads of R&D from across a whole range of different sectors and disciplines, and coalesce

them into something that looks strategically sensible? For example, think about the circular economy principles of zero waste – not just in food production and freight and retail but also in how to build those principles of sustainability and zero waste into the research that is happening and the support that is provided on-farm. How do we look at our supply chains in that sense? How do we think about embedding better GPS data or systems for those supply chains and on-farm production? We now have phenomenal capabilities to provide real-time data streams – from our extraordinary satellite network and now also a data cube managed by Geoscience Australia – to provide that real-time feedback on-farm and lift our technological capability. How do we do that in a way that is integrated and self-evident, so that farmers, food-producers, are highly motivated – financially and from an efficiency perspective – to jump into that system?

When it comes to research in particular, I think the biggest shame that we have in this country is that we are actively discouraging people who don't, if I'm frank, who don't look like white men, from being active participants and successful long-term participants in our R&D system. We are not good at nurturing their careers. We are not good at providing them with training opportunities, with job security, with incentives. There are plenty of incredibly clever people with a strong will to problem-solve who, I think, would bring a lot of new solutions. We know that diversity brings stability. If you look at the biological system, it does not work without that diversity. So why wouldn't we nurture ourselves to thrive as a diverse and incredibly proactive R&D system?

I could go on.

Moderator: John Anderson

We can come back, Kylie.

Robert, at ASPI, your particular field relates to the interplay between climate change and geopolitical security and stability. What should we understand? What can we know?

I put the hypothesis to you that we know the science on climate change is very real but, as I understand, the modelling cannot yet tell us terribly accurately what is likely to happen region by region. In rough terms, we are swimming in tank of a fair bit of uncertainty.

What observations would you make, as of being of primary importance?



Robert Glasser

Let me start by further elaborating on what the science can and cannot tell us. I think one of the things that science has a hard time with is the impacts of climate change, partly because of the difficulty of considering climate change as a whole system change. People think of it as meaning a particular hazard or a natural disaster that strikes. Even the UN IPCC assessments, when they examine, say, the impact of climate on agriculture, might look at extreme temperature and what impact that has on a crop. They might weave in a few other variables, but not drought, fires, population displacement, stronger cyclones and hurricanes ... all those things that are essentially happening virtually at the same time as the climate warms. One problem is that it is extremely complex to see these simultaneous events and how they cascade in society.

I should add that we are seeing this now globally in many different ways. In France, the drought is causing challenges with their nuclear energy because they cannot cool the reactors. In Australia, during Black Summer (2019–2020), we had record drought and record temperatures that triggered record fires so intense that they generated their own weather and, according to the Royal Commission, burned over 20 million hectares. It was an economic catastrophe; it was a biodiversity catastrophe; it was an air quality catastrophe; and it very nearly became a water supply and water security crisis for Sydney because, as you may recall, at the height of those fires the Warragamba Dam was threatened – the major supplier of Sydney's water.

We talk about geopolitical manoeuvring. A way of thinking about that is as China, say, and the United States being like the pieces on the chessboard moving around. But climate change is upending the chessboard itself. The other element that I think the modelling has difficulty with – in relation to your point, John, about regional impacts – is the resolution of the models. For society to act on a lot of the climate impacts predicted, communities need reliable information about what's going on at reasonably small scale – small areas, where cities or communities or even watersheds are located. Right now, a big effort is underway to increase that resolution, and there is a lot of progress happening on that.

The dimensions with security are fundamental, and food is absolutely at the centre of the concern about climate and security. The same UN assessments are already detecting simultaneous climate impacts on multiple bread-baskets around the world, and the science suggests that those impacts are going to increase and become more severe. In Australia, the current government, as some of you may be aware, has just asked the head of the Office of National Intelligence, Andrew Shearer, to lead the development of Australia's first climate and security risk assessment. That work is underway now across government departments and it will be looking at the range of ways the systemic change is affecting Australia's security interests – and they are very serious ways. For example, competition and cooperation with China. Climate change is affecting the South China Sea, which is, as you may already know, a climate and security hotspot: fish are moving to cooler waters; maritime boundaries are shifting as a result of sea level rise. This will exacerbate tensions between great powers, and between regional powers as well: for instance in the Mekong, where upstream countries – mainly China in this case – control through dams the water that flows to downstream countries, there are some major security issues. But those are narrow security issues.

There are broader ones: for example, if we in Australia struggled to manage Black Summer, imagine how a country like Indonesia, 200 km from Australia at the closest point, will cope, with 275 million people mostly located along coasts and in island archipelagos where sea-level is rising at least four times faster than the global average, where 1-in-100-year extreme flooding events will become annual events in a matter of a couple of decades. Imagine these systemic climate impacts happening, not individually but collectively one right after the other, and in a region that is already the most geologically active region in the world – the Ring of Fire, where Indonesia and the Philippines alone account for something like 80% of global volcanic risk. That's just looking at the physical impacts. Then if you overlay the lack of social safety nets, the large informal sector, the ethnic separatist movements, the Islamic extremism, transnational crime and disasters, and the spaces this will create for those actors to gain

influence and to operate successfully, to expand their operations, and the displacement of people on large scales ... you can get a flavour of why the government is now looking at this as a security issue. You can understand why the Australian chief of the defence forces has described it as a major security issue, and why even two weeks ago when the chiefs of almost all (China wasn't there) the defence forces of the Indo-Pacific convened in Sydney, the number one item on their agenda was climate and security.

Moderator: John Anderson

Well, if we weren't sober before, I'm sure we are now.

Allan, can we come back to you. As we have all acknowledged here, this is a global problem. In Australia it strikes me that much of the debate is focused on what we do, without a realistic understanding of how it might fit into the global architecture. I am deeply troubled by the reality that there are hundreds of new coal-fired power stations being built around the world: 172 new ones, as I understand it, being built in China right now as we sit here; 56 in Indonesia, I think it is; 46 in India; quite a few in Vietnam have reopened, and across Europe, and so on. Can you give us a feel for where those countries that are still rapidly increasing emissions really sit on this issue? Forget the things that they have said publicly at the COP meetings and in the Paris Agreement, and elsewhere. Where does China, for example, really sit on this issue? Is it prepared to be a global citizen or is the Chinese Communist Party (CCP) in the end simply more interested in its own power?

Allan Gyngell

I think the CCP is most interested in its own power, but one of those interests must be to ensure that economic livelihoods of China's people remain viable into the future. The degree of environmental stress in China is very high. Water, for example, is severely limited. So I actually do take the Chinese at face value when they say they want to do something about this – and then the question becomes: How do you do it; and how do you manage transitions, from where you are now, to where you are going? Robert probably has a much more granular understanding of this than I do.

Robert Glasser

I'm not a China expert, but I think they have multiple interests and objectives, and we see that play out and the objectives change, given the time and the context, as well. The hydropower on the Mekong, for example: first, that helps them with their energy security because they have created hydroelectricity. Second, they control the water, so that's good for their water security. They are investing in hydroelectricity and renewable energy globally, and they control critical supply chains of those technologies, so there is an economic interest as well. Third, if you control the upstream water, it gives you leverage over downstream states that you can exercise if you want to. We saw disputes with Japan recently where China cut off supplies of rare earth minerals to Japan in the midst of the crisis, demonstrating they are willing to use that leverage, at least in that instance. And fourth, I think they are genuinely concerned about climate change. They are the largest emitter of greenhouse gases and funder of new coal but we need to put that in perspective; it's really no surprise, given their path of development. What matters is, how quickly are they switching to renewables? The coal plants will be there

for a while, many years, but the share of renewable energy that is making up their total energy is growing phenomenally fast, faster than anywhere else in the world. I think that doesn't mean we should be complacent from a security perspective, but just that they have a variety of objectives that they can meet simultaneously.



Robert Glasser, Kylie Walker, John Anderson, Allan Gyngell.

Moderator: John Anderson

Kylie, it's my view that agriculture can provide some of the answers, particularly in terms of Australia being, if you like, recyclers of carbon if we can just capture and hold some more of it. Many people have done a lot of thinking about this, and while some are excited others are highly cynical – there's no other way of putting it – and that includes people with a lot of knowledge. Do you have any thoughts on where the 'lowest-hanging fruit' and some of the obtainable fruit might be, in agriculture, given that agriculture is a serious contributor to greenhouse emissions?

Kylie Walker

Well, obviously, there has been a lot of discussion about the future of protein, and that is something that I think we should be vigorously pursuing – looking at plant-based protein. Carbon capture and storage, as you observe, is quite controversial, even among the fellowship of the Academy of Technological Sciences and Engineering. Our fellows are leaders across those disciplines in Australia and internationally, and they are divided about the relative merits there. But I think that we are at the point where we have to pursue all potentially viable options. Agriculture can be a positive net contributor to our emissions status, or it can be a negative net contributor. That is a choice both for individual producers and also for investors, governments, infrastructure and R&D.

It is not as simple as planting a lot of trees, obviously. What we can do is look at multiple uses of land. For example, Australia ought to be a clean energy leader globally, given the circumstances in which we geographically find ourselves: being an enormous landmass; being abundant in natural energy sources; and being reasonably technologically savvy by world

standards with a fairly high success rate in terms of our research and the hit-rate that we get for all the traditional impact metrics around publishing and adoption, etc.

We do have some lessons, I think, that we can work on in conjunction with a place like China, because we both have large landmasses; we both have challenges with flood and drought; we both – although obviously the populations are not comparable – have strong incentives, I think, to build sovereign capacity as well, for very different reasons. We saw some of the challenges, obviously, with global supply chains over the last few years with the advent of the pandemic. That is not going to go away, because climate change will continue to exacerbate that accessibility and that potential for continuity of freight. But we can take advantage of that and become a net exporter of clean energy as well.

I think, as well, there are some very interesting things being done in R&D in Australia for carbon capture and storage: not on-farm necessarily, but in green concrete, for example, where carbon from the air becomes a resource for us to use. Some Australian innovations have done very well at the recent COP meeting and been flagged as something to watch for the future. Green concrete is an Australian innovation – the result of collaboration between a private company, the New South Wales Government and a university. It has been used to reclaim land in Singapore and build new suburbs. The process is a net extractor of carbon from the atmosphere, rather than the normal concrete production process which is a high producer of carbon emissions.

So I think there are lots of interesting opportunities for us to explore, but it needs the will, the investment and the long-term vision.

Moderator: John Anderson

Now the panel is open to questions from the floor. Who will be first?

Q: Natasha Chabbra, Australian Council for International Development

I really appreciated your comments, Dr Glasser, about the reasons to act in the region and the high level of exposure to climate change. We are doing a fair amount of work at the moment on humanitarian crises in Africa and the Middle East, and the rising food insecurity and the threat of famine as well. I am interested to hear your thoughts, and those of anyone else on the panel, about what the reasons to act are in those regions. For Australia specifically, we have seen great focus on the Indo-Pacific, but for some of these countries in Africa and the Middle East food insecurity is a really grave issue, and drought trends in the Middle East as well will continue to compound that.

Robert Glasser

The term 'humanitarian' used to be in the aid program. That was the one clear objective. That was actually the term used, I think in the white paper that developed the Australian aid policy, or established the policy many years ago. The one clear objective was that we were not going to confuse our economic interests or our diplomatic interests with our humanitarian interests. Unfortunately, I think the trends that we are seeing, particularly with climate change, will make it even harder to justify aid interventions that are not seen as more narrowly in

Australia's interests. I will give you one illustration. With climate change, we are having big disasters in Australia, national-scale disasters, that we are just beginning to see now. At the same time, we are having dreadful humanitarian disasters: the food security crisis that is evolving now, with another La Niña in train, could become extremely serious within a year. I remember when we came back from Switzerland, from Geneva, and I was working with the UN, it was in the midst of the big drought. When it came time for our Qantas flight to land, the cabin crew, instead of passing around envelopes for change for good for UNICEF, were passing around envelopes to help our drought-stressed farmers. It was a very interesting moment for me because I realised that as disasters begin affecting us domestically it is harder to justify sending money outside Australia for whatever the humanitarian need is, when there's a huge and growing need in Australia.

Sadly, I think the argument we have to make is that human security, even in our immediate region, is a bit like forward defence for Australia: that we have to support agricultural research, drought-resistant crops, the range of issues that will mean that when these hazards strike, people are able to cope. If they are not able to cope, they are going to move. Most of them will move internally, which will create its own problems, but many will also do what they can to survive, including moving to other countries, which will then trigger other problems. So, unfortunately, I think we will increasingly need to make that connection more narrowly in terms of Australia's national interests.

Kylie Walker

If I can add on that, I think that there is a really strong case to be made for building mutually beneficial relationships, where it is not just about investing one way, it is not just about giving something and building capacity somewhere else. It is about building relationships, learning from each other, and together growing collaborations that are mutually beneficial.

The Sir John Crawford Address that we heard last night was very interesting. The idea that grabbed me was that there is an opportunity in this global region to lead the way internationally in terms of integrating traditional knowledge systems – and what they can teach us about sustainability – with modern science and technology. And if now is not the time to do it, then I don't know when is, because it is existentially urgent that we have a more sustainable approach to food production and to living as part of the natural world.

Robert Glasser

I agree, and I did not mean to paint such a bleak picture, because there are a lot of innovations in Australia that are not particularly expensive to share as well, that can have a big impact. In fact, we need to identify these initiatives, because the money is always scarce. Knowledge can leverage a big change that can be helpful for other countries dealing with these impacts.

Moderator: John Anderson

In the Crawford Fund we have always acknowledged the extraordinary value of being in step with research and development efforts elsewhere, because as we export our knowledge we can import knowledge gained by interacting with others around the world.

Q: Nicki Duncan, Charles Sturt University, a conference scholar

Kylie, something you said reflected conversations I have had with others here today, which is that there seems to be a recognition that we are in crisis, that something needs to happen. There is obviously so much research and development going on; innovations in so many different sectors are 'out there'; they exist. But there seems to be a gap in how to translate innovations into policy outcomes; how we can cement this, from the field into practice, into widespread practice. You mentioned integrated and self-evident systems, where we are motivated to do the right thing, I think? I welcome comments from anybody here in the panel to tell us how we do that. How do we bridge the gap from innovation to practice, especially under this climate imperative, this existential problem that we find ourselves in?

Moderator: John Anderson

Clearly the uptake of research, which were talking about over afternoon tea.

Kylie Walker

Yes. This is something that Australia has struggled with for a long time, and we have done it better at times in the past. We have also done it worse at times in the past, and we could certainly do it better now. I think that there is a range of different ideas that you could apply there, but the simplest thing is funding sources to connect the research with the development and the widespread implementation, and that also includes public awareness – which is crucial. Organisations like mine put a lot of energy into bringing expert advice, the advice of researchers and developers and innovators, to decision-makers. That is also crucial, because you can't leverage off an innovation if you don't know it exists.

But let's think a little bit more creatively about that right now, and think about how we might potentially embed primary producers into R&D programs, or vice versa. Let's use the knowledge that the people on the land and at the farm gate are harnessing themselves. Often that is generational knowledge that they have. Let's integrate that more effectively into the way that we do R&D. Let's harness those data. I spoke about the potential and the reams of data that we have coming in already. The amounts of data are exploding, just as – thankfully – the computing power is starting to catch up; and there is lot of hope with quantum computing as well. But let's harness those data more effectively and ensure that we are building systems that are able to analyse them in real time and then feed information back to people on the ground, so that they are empowered to continue to innovate from week to week, from month to month.

I think that's going to become increasingly important with climate uncertainty and extreme events, because, as Robert mentioned, the modelling is reliable to a certain point. We have very sophisticated modelling, but the systems are not behaving the way that we have always expected them to. So we need to have that two-way relationship between the data generator and the data user, and that line becomes increasingly blurred.

Allan Gyngell

I want to add to that. This is also fundamentally the job of public policy. When I was working in the public service and, for a while, up in Parliament House, I would frequently encounter

academics in my area (and I am sure the academics here today are all totally different!) who would say to me, 'Oh, I know so much about this matter. I have all these answers. But do the ministers ever telephone me? No, no. I just sit here in my office over at the ANU.' And I would have to tell them, 'It's never going to happen. Ministers like John Anderson are never going to think to themselves: "I really should call up someone at the ANU and ask the answer to this".' Part of the solution to how we bridge the gap is what Kylie was just saying: it's for your organisations to recognise the need to communicate to get research into practice. But also, you, as academics, do have to be active participants in the public debate, and willing to go around and to knock on doors and to tell people that you have answers which will be helpful to the country.

Moderator: John Anderson

Engagement is so important. We live in the age of disengagement right across the Western world. I don't think I mentioned this in any of my broader remarks, but I was fascinated to talk to a former Supreme Court judge in the UK on a podcast the other day, and he made the observation that in Britain – and this is paralleled everywhere, including in this country – in the 1950s and 1960s the British Labour Party had 1.1 million regular members, rank and file, and the Tories had 1.9 million: that's 3 million in total. Today, the British Royal Society of Birdwatchers has more members than the current numbers in the political parties combined.

Decisions are made by those who turn up. Young scholars, your country needs you to be involved in more than just your academic research!

Robert Glasser

I want to comment on this as well, because in my experience in CARE and NGOs I have seen so many projects that demonstrate remarkable results, and simply become a report that sits on a shelf. It's very important to keep in mind that virtually anyone who has some issue that they care about can demonstrate, with data, that investing another \$5 in that issue will return \$150 million. The real question, as Allan I think was hinting at, is how do you get heard?

Why does 'that' issue get accepted when 'others' aren't? They all have data about the return on the investment. It's not that the accepted issue demonstrates a principle, though it is essential to do that. And it's not just that you can demonstrate that your issue is a good investment. Assuming those two things are in place, the challenge is: 'How do you win the political debate?'

An approach that I have seen succeed is to engage, as part of the pilot, with the local government, for a community-level project, so that the government is an active participant. That way, you begin developing the ownership, the government's ownership, while you're advocating at a national level as well, to try and bring those two pieces together. That way, the government is already basically committing to expand the project once you have demonstrated the results to wider districts or provinces and the like.

Kylie Walker

If I could jump in here, I am a long-term communication professional and I have empowered many scientists and technologists to communicate better, so I am always going to say you

need more capability in that respect, and that more communication is better. I think that the days are long gone where a scientist can afford to say that communicating their work to a broad audience is not part of their core job. Your scientific findings have to be something that you advocate for at the local level, and at the public level, and at the political and investment levels, and if you can't do it yourself then hook-up with a science communicator or an organisation that can do it well. The market for funds and adoption is a crowded space. There are probably more than 400 registered lobbyists in this town, and there are 'big bucks' going into creating very sleek well-thought-out presentations to convince politicians to make funding decisions and investments and policy decisions. You have to compete in that market!

I am not suggesting that every scientist ought to be an advocate. Of course that will not be everyone's comfort zone or skill set. But you must be thinking about the end uses for your work, particularly when you are talking about agricultural research, which is very practically focused. How is this going to benefit Australia, and the world? How can it be rolled out in a practical sense at a local, national or international level? Who do I need to be connecting with, collaborating with, influencing, in order for that to happen? Or who can help me with that?

I think that you're abrogating your responsibility if you simply produce the research findings, publish them in a paper, and consider the job done.

Moderator: John Anderson

Kylie, I agree with that and I want to add a little to what has just been said, because I think it is important. Allan, I think, alluded to it.

One of the problems we now have – following the great financial crisis, which was a debt crisis solved by more debt; following COVID, where nations threw everything they had at trying to keep their economies basically intact; and now with other global shocks, supply chain inflation and what have you – is that every government that has any degree of responsibility around the world is deeply conscious that they must look for savings.

Why do I mention that? Because it's an added and very real problem globally, including in China. And because it's also critical.

If you want to reach governments, the sophisticated and true and honest line to run is to differentiate between simple demands for more recurrent expenditure, and investment in wealth creation and a better tomorrow. Some forms of further borrowing are actually net positive: high quality research, like high quality infrastructure – and I stress *high quality* infrastructure – very much fits into that category. The message needs to be: *'Minister, this is not just going to be money out of the door that goes onto the bottom line. This will help solve your future debt.'*

That is a big hint for you, young scholars, when you start knocking on doors for funding.

Q: Tony Fischer, The Crawford Fund

I want to take us back to the comment about where the low-hanging fruit is in agriculture, and I am taking a global view rather than an Australian view. In sub-Saharan Africa, crop yields are

probably one-third of what they could be in that location just using today's technology, without any new innovations or new research. That region is importing more and more food every year. It's not developing rapidly economically. The population growth is over 2% per annum. There will be over 2 billion people in sub-Saharan Africa before the end of the century – there are 1 billion at the moment. However, we have an example from sub-Saharan Africa where improvement has happened. I don't know who got through to the president of Ethiopia, President Meles Zenawi – who unfortunately passed away a few years ago – but Ethiopia's statistics are very good. You can believe them, I think. I have checked them. In the last 20 years, Ethiopia has increased food production across all its crops at about 3% per annum. That's better than the rate during the Green Revolution.

How has it happened? They have invested 15% of their budget in agriculture – far more than the other countries in sub-Saharan Africa, which invest only around 1% or 2%. Ethiopia has invested in the sort of agricultural extension we heard about from David McGill this afternoon: farmer extension. The technology was there, on the shelf: some had come from the international crop centers and some came from local research institutes.

To me, this example is a bright spark in a difficult part of the world. Whether it's relevant to Australia, I don't know, but it's relevant to Europe, because that is where a lot of the refugees are coming from.

Moderator: John Anderson

That was not so much a question as a very pertinent observation. Thank you, Tony.

Comment from Andrew Campbell

We [ACIAR] have a fantastic program in Ethiopia and it's notable that the Agriculture Minister there has a PhD in agricultural science, as does the head of his ministry, and a very competent innovation system.

Moderator: John Anderson

Ladies and gentlemen, I think our three panellists have given us gold content, and I'd love you to show your appreciation.

Allan Gyngell AO has had an extensive career in Australian international affairs. He was appointed the National President of the Australian Institute of International Affairs (AIIA) in September 2017. He is an honorary professor with the Australian National University's College of Asia and the Pacific, and a director of China Matters. He was the Director-General of the Australian Office of National Assessments from 2009 to 2013. Prior to leading the ONA, he was the founding Executive Director of the Lowy Institute for International Policy from 2003 to 2009. Additionally, he has worked at the Department of Foreign Affairs and Trade and the Department of the Prime Minister and Cabinet, serving as an Australian diplomat in Rangoon, Singapore and Washington. He was Senior Adviser (International) to Prime Minister Paul Keating between 1993 and 1996. Mr Gyngell was appointed as an Officer in the Order of Australia in 2009 for services to international relations. In 2007, he co-authored *Making Australian Foreign Policy. Fear of Abandonment: Australia in the World Since 1942* was released in 2021 and he is the co-presenter of the 'Australia in the World' podcast.