SESSION 4.1:
SOLUTIONS FOR RESILIENT FOOD AND NUTRITION SYSTEMS ON-FARM

Panel Q&A

Professor Jamie Pittock[1], Professor Kadambot Siddique AM FTSE[2], Dr Roya Khalil[3]

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Chair: Dr Terence Farrell, Head of Economics,
Grains Research & Development Corporation (GRDC)

Q: Louise Walker, Latrobe University PhD student, Victoria

My question is for Professor Siddique. You mentioned quinoa, which is fantastic. It seems to be somewhat of a success story in terms of taking a traditional Indigenous food and then marketing it towards a Western or international market as well, so it seems to benefit both parties really nicely. Can you describe what allowed that success story to happen – whether specific traits, or the markets that were used? And do you think there is opportunity for other crops where there may be Indigenous knowledge on how to grow them but also potential for international markets?

A: Professor Kadambot Siddique AM FTSE

I think it's a combination of various factors. Certainly, one is identifying the 'goodies' in a food, both in terms of nutrition and also environmentally, and the second factor is the promotion. Having the UN internationally involved has helped for quinoa, and its adaptation to various environments has been tested with a lot of germplasm, including in Australia, which has started production. Bhutan has just started a GIES – geographical information and environmental system – for quinoa and that's getting momentum. It's a combination of factors.

Another example is chia. Australia is one of the largest producers of chia. It is of South American origin. A young farmer went on a Nuffield scholarship – he became an entrepreneur and started producing chia in Kununurra in the Kimberley region of Western Australia. Lentils in Australia is another example, promoted initially by the GRDC; they are now a big commodity in Australia. There are many other examples.

Q: David Guest from the University of Sydney

A number of people have mentioned stunting, and I just want to point out that malnutrition is not the only cause of stunting. In the work that we've done in places like Bougainville and Sulawesi (50% of the children are stunted in Bougainville, 30% Sulawesi), stunting is not because of a shortage of food. It's because they're drinking dirty water and they have chronic dysentery. And that is something that is very easy to address.

A: Professor Kadambot Siddique AM FTSE

I agree. Again, there is a combination of factors in this, but that is why holistic approaches are required and the root causes need to be identified first and addressed. That is a priority.

Q: University of Tasmania Masters student.

My question is for Jamie. You talked about the soil monitoring tools that farmers are using. How do farmers decide how much water they need to apply, from the data of the moisture meter? Do

they have the help of experts, or can they decide by themselves? And another question: in Tasmania, farmers are using moisture meters but some farmers have complained they get in the way of the cultural operations needed in production.

A: Professor Jamie Pittock

The tools were designed to provide the simplest information for farmers to use to make decisions. The soil moisture reader summarised the soil moisture into three classes: red, green and blue. It was then up to the farmers to interpret how to water that ground, that field, for a particular crop. There was no manual. Nobody needed to tell the farmers what the reading meant. The tools were so simple that the farmers very quickly learnt how to apply them themselves. If anybody wants to find out more about the tools, you can look at the website https://via.farm/, Virtual Irrigation Academy farm.

The moisture meters commercially available in Australia are vastly more expensive and much more complicated – you would need some technical knowledge to know how to interpret them. That's why CSIRO developed these tools that are much more simple to use.

Sadly, in many cases, farmers who have started off using these sorts of soil moisture probes stop using them after a period of time. Perhaps they have developed a different practice and feel that is sufficient without spending time monitoring the soil moisture? I am not sure that is wise, but that's what's happened in practice.

Q: Dr Shahin Rahman, Department of Primary Industries & Regional Development, Western Australia

My question is for Roya. I am very interested in the biofertilisers. I would like more information on the adoption rate of biofertilisers in broad agriculture, and if there are any disadvantages that these biofertilisers possess over the chemical fertilisers.

A: Dr Roya Khalil

As I said, we have tested this product and made various formulations of biofertiliser available for different segments of the market: pasture, broad-acre and, more importantly, horticulture – for lettuce, cauliflower, celery, etc. The main reason for the interest from the horticulture segment is because traditionally they have been users of fresh manure and compost. Unfortunately, with fresh manure, pathogens are a big challenge. Even compost is not really 100% compost: there is still a risk of pathogens. With compost there is also loss of nutrients, because it takes so much time to form and there is volatilisation of ammonia. Because those farmers are more interested in using this product, we have more results for its use in horticulture.

Compared to inorganic fertilisers, we haven't seen any disadvantages, because nothing in these formulations is new to the soil. Manures and compost were all already in use in the agriculture system. What we have done is remove the pathogens, and we have dried it a bit to make it easier to transport. The inorganic fertiliser in the product provides nutrients and the functional carbon comes from mined products that are already in use in the fertiliser industry. The innovation in the product is that it combines materials already in use in standard farming practices and turns them into single granules for ease of application. I don't see any disadvantages in that.

As with any new technology, the investment is expensive; there is significant cost in building infrastructure and introducing it to the market, so at the moment it costs us to make these

products, and that's why the products are not aggressively in the market. There has only been a 'soft launch'. If we can produce it at commercial scale, at an optimised rate and cost parity, I think that biofertiliser will be available at a cost that is achievable for the farmers, and I think that will benefit everyone.

Q: Dr Terence Farrell (Chair)

Most nitrogen fertilisers can acidify soil, and you need to use a lot of lime, which also affects emission of greenhouse gases. What are you doing to mitigate the extra nitrogen use with lime to neutralise those acid soils? Is biofertiliser any more acidic than urea?

A: Dr Roya Khalil

Biofertilisers are no more acidic than urea. Biofertilisers have been designed to be very similar to the inorganic fertilisers, in chemical and physical performance. We do, however, have other products that are specifically designed for acidic soil.

Q: Warren Lee, FAO

My questions are to Professor Siddique. First: the future smart foods that are identified by countries have a lot of advantages, for nutrition and for farming and for the environment. How good is the uptake of these foods in those countries, and what challenges face the farmers in growing these kinds of crops for food production and for profit?

Also, in relation to the introduction of quinoa to Asia, a colleague in my office is very keen on quinoa and is trying to promote quinoa production in different populations. But he has told me he has noticed a bottleneck in the availability of good quality germplasm from the countries where they produce quinoa. How do we solve this issue of getting good quality seed so that people can be growing quinoa in Asia's soils?

A: Professor Kadambot Siddique AM FTSE

Your first question is how well these foods, these smart food crops, are being adopted and what are their values.

Basically, there's no problem in growing them because the countries have identified them as important crops from previous times in those landscapes. The problem is that in most of those Asian countries rice, for example, is dominating, along with maize and wheat, so the profitability of those crops is very high and yields are very high, and the governments are giving subsidies (as Kym Anderson has said earlier today), and there is less incentive to grow smart food crops.

Therefore, it is important to integrate these smart crops into the mainstream cropping system. Also, governments need to support their production, and promote their benefits, and then city-based consumers will buy them. In Nepal, for example, there's a commodity called large cardamom that is being integrated into the farming system. And there are examples elsewhere of that happening.

There is a bottleneck: we need to overcome that through various strategies. Quinoa genetic resources are available in a number of countries. For example, India is not the origin of quinoa, but they have been able to get it. In Australia we have a number of lines. Saudi Arabia also. I'm not sure where the major genetic resources are available, but it can be brought into a country through following appropriate procedures and evaluated.

Chair:

We must stop there. Thank you to our three presenters for a diverse range of topics. You managed to combine them very well.

Please join with me in thanking everyone who has contributed.

Bios of these panellists are given at the ends of their conference papers.