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Panel Q&A: Ending hunger; ‘Big data’ for smallholders; Digitalising agriculture

Dr Lindiwe Majele Sibanda, André Laperrière, Dr Andy Jarvis

Chair: Professor Andrew Campbell

Australian Centre for International Agricultural Research (ACIAR)



Andy Jarvis, Lindiwe Majele Sibanda and André Laperrière in the Panel Q&A

Q: Christine Freak, AgriEducate

A dominant theme which has emerged during this conference has been the need for nutrition-sensitive agriculture and we've seen a shifting emphasis from quantity of production on the supply side, to the quality of consumption on the demand side. We talked last night about how this speaks to a larger recognition with interrelationships between health and environment and agriculture. Given this focus, how can agricultural development respond and, for example, do we need better conversation between nutritionists and agricultural policy makers?

A: Lindiwe Sibanda

Thank you for that question. I want to believe the starting point is all of us admitting to what we know and what we don't know. Speaking from the agriculture community, I think when we define food security I, for one, was one of those who always used to push back when the nutrition mafia would break into the room and say, "Where's the nutrition part?". And we'd say, "OK, keep them quiet; add the word 'nutrition'", because they would insist that food security is not speaking to nutrition. We would say, "But it's speaking to production, it's speaking to access, it's speaking to utilisation, and utilisation is about nutrition – so what's your problem?". When they fought more we then added the word 'nutrition'. But from what I know now, it's not true. We didn't understand what the health outcomes are of malnutrition. To us, on

This report of the Q&A has been prepared from a transcript.

the agricultural side, it was, “You’ve got the food, you are eating it, so you are nourished – what’s your problem?”.

Now I can confess that I did not understand that no one food can meet the nutrient requirements of your body, there’s got to be diversity. Second, I did not understand that in our quest as agriculturalists to add value, or to modernise, we spent more energy, particularly in Africa, removing the nutrients so that we have white rice, and white super-refined mealie-meal. I remember my dad used to protest, once we left the village and we were in the city, whenever we cooked our maize meal using not the super-refined type but the one from the village. He would say, “Guys, have you run out of mealie-meal?” and we’d say, “Yes, we’ve used the one that came from the village because we’ve run out of the proper one”. And now I know the ‘proper one’ has no nutrients in it as we have not been fortifying; it was just empty calories. What it means is, it looked good, but it was devoid of nutrients.

I think these two communities – health and agriculture – need to come together, and while that is easy, there is no sector or ministry for nutrition. What that means is, within government, you can have a Department of Agriculture, a Department of Health, but nutrition falls between those two. And so it means the poor ‘orphans’ who are nutritionists have to understand the agriculture and have to understand the health sector.

So in the agriculture department we have to talk about nutrition-sensitive agriculture, and what that means is you can plan your green revolution projects, which are talking about yield, but you have to go back and say, ‘What is the quality of the soil? Can the food that you are producing take up the nutrients from the soil? If not, when you are choosing your seeds, are you using the seeds that have been fortified, or the fertiliser that’s been enhanced for the micronutrients that are not in the soil?’.

There are a lot of interventions that can make agriculture nutrition-sensitive, but we’ve not been talking about them. For example, harvesting, storage, making sure there’s no aflatoxin contamination, fortifying as we’re processing the food, and also the cooking processes. On the health side they talk about health-specific interventions, and that’s just adding vitamins and breastfeeding. The two languages need to meet somewhere in between; nutrition-sensitive and nutrition-specific interventions.

Q: *The University of Adelaide*

My question is to Lindiwe again. Lindiwe, thank you for your inspiring and fantastic speech last night, which reflected your belief and respect in traditional diversified farming systems and traditional agriculture. My question is, while we’ve had a fantastic day today learning about how digitisation can bring a revolution in agriculture, what is your advice to young people working in agriculture, so that while we go ahead and we empower and enrich smallholder farmers with digital agriculture, at the same time we maintain and we respect traditional belief systems and carry that legacy for us and for future generations to come?

A: Lindiwe Sibanda

Thank you. I'll just repeat the question: What do we say about indigenous knowledge with everything we've heard today, and what's the advice to young people in terms of the way forward?

For me, the biggest challenge is just mutual respect. As researchers, we've gone in to teach and not been honest to ourselves that we're going into the farming communities to learn. And there is a big difference! So our communities have given us the respect believing that we are the experts, and yet the 'ex' means you know nothing; you're coming to EXtractively take away knowledge which you process and publish. Maybe we should be changing the mindset and narrative to say we've come in to learn. Then people respect you and they'll tell you the truth.

Unfortunately, research for development has caused more confusion in the whole matrix, in that you will get CG System people coming along with the 4X4 truck that says 'Beans for Life'. They sit our elders under a tree and say, 'We've come here with our thousand questionnaires and we're going to ask you some questions'. They know they are going to get free seed because the truck that came the previous week gave them fertiliser, and they know exactly how to respond. Farming communities have become smarter than those who think they're teaching them, because they know that 'Dams for Life' will give you a dam. If it's World Vision, if it's CIAT, they'll give you some seed, and they'll choose the farmers who are good, so that they do the experiment.

I believe we must be changing the narrative so that, first of all, we respect each other. We come with nothing; we're coming to learn. And when we learn, we'll develop a plan. Once you have a plan, when Andy Jarvis comes with his CIAT truck, you'll say, "Sorry, we don't need beans. They are not in our plan." But in most cases it has been, "We'll spoonfeed you because we've chosen this area. We want to pilot our beans here; otherwise there's nothing for you." So I think it's time for mutual respect and honesty and building of trust in terms of what we want and what farming communities need.

In terms of data, I believe the exciting thing is that very soon we'll do away with the questionnaires. We'll be able to say, "We need information." Africans now almost all have cell phones. In my village they'll even have two each, because they have one for the mobile network provider that allows them to talk from the house, and another one they use from a hill because it's got better connectivity. So now we have to go back and say, "This tool is powerful", which is exactly what we're saying here. "If you want data, this is what it will help you with – information to be better farmers."

Yesterday I spoke about Moses. Moses still plants on 11 November, because that's been the traditional planting date in Zimbabwe, Lower Gweru. Moses has no labour now because all the children now have to be educated like the cousins in the city, so it means it's him and his wife on the farm. Moses has gone to find work in the city, so it's the wife alone: the yields have gone down due to recycled seed and low fertiliser use, plus many other reasons. So can you imagine going back to Moses and saying, "Come back to the farm. We'll now be able to

give you information. We'll give you loans and we'll give you insurance and we'll be able to use index-based insurance, and you'll be able to insure your assets. You don't have to sell your goats after every drought." I think that's a new narrative that will make farming attractive, and also that youth will find space in solving these complex problems.

Q: Denis Blight AO, Visitor at ANU School of History

My question is a historical one. Firstly, a confession on behalf of Sir John Crawford. He was Chairman of the Board of IFPRI in the early '80s, late '70s early '80s, and when the question of priorities came up, he said, "For the moment, let's give a lower priority to nutrition". So that relates to your comment, Lindiwe, on what we knew at the time. IFPRI, of course, has since corrected that approach and gives high priority to nutrition.

Now my question is to Andy. If I'm not mistaken or didn't mishear you, your presentation was predicated on the continuing existence of small farms. Are we missing a trick there? Because the Director General of IFPRI in a presentation here a couple of years ago said small farms have to get bigger and that's an inevitable consequence. Now if small farms do get bigger, if Moses sells his farm to a neighbour and that's a bigger farm, does not that assumption need a bit of adjustment?

A: Andy Jarvis

I think Mario [Session 2, this *Proceedings*] mentioned this as well. You've got a system right now where you've got – according to our best data – 570 million farms, of which 72% are smaller than a hectare. That's an awful lot of smallholder farms. So even if this kind of aggregation starts happening now, it would be reversing a trend, because at the moment farms are getting smaller and smaller as generation after generation divides the property up. So even if that reverses over the next two or three decades, I think, smallholders systems are here to stay.

It's a very active debate right now, but there's a lot of farming-system models and analyses showing that the smallholder system is highly optimised and very economically effective, efficient. So, I don't know ... I contest the idea. I think there is a lot of aggregation going on, but equally there's a lot of disaggregation going on, and I don't see in the next two or three decades that there will be a major transformation in the distribution of farm sizes. Maybe I'm wrong, but I think it's a very interesting debate.

Q: Malcolm Wegener, The University of Queensland

I think it's absolutely fantastic what's going on in developing countries in utilisation of technology and 'big data' and so on. In many respects they're probably even well ahead of what we're doing in our own country. I'm concerned that the development of the software is running well ahead of the development of the physical infrastructure. I guess I'm influenced largely by a fairly limited experience in Indonesia where I think farmers are close to being able to sell their coffee via their mobile phone, while the infrastructure for moving agricultural products from farm to market is abysmal. Who is going to be able to address this serious issue of improving infrastructure in developing countries?

A: Andy Jarvis

All I can do is agree. I didn't mention mobile money; mobile money is just transforming market systems! It's incredible! But yeah, you still have to move produce. At the end of the day you can't text a tomato.

A: Lindiwe Sibanda

I can speak to Africa and the newly appointed, no longer new, Dr Akinwumi Adesina of the African Development Bank. In his commitment statement he pledged five high points. Number one is 'Light up Africa'. And that's really infrastructure. He's saying energy is the number one improvement that must happen. Number two is 'Feed Africa'. Number three is 'Industrialise Africa'. Number four is 'Integrate Africa'. Number five is 'Dignity for Africans', but really he says infrastructure is key in making it all happen ... unless we 'light up Africa' and provide energy for Africa, that energy comes with storage facilities to reduce post-harvest loss, processing to add value, and with roads! So it's in the agenda, but now it's the financing to make it happen, so at least it's not been forgotten.

Q: Bhakti Haldankar, Agricultural science student at the University of Sydney

Mario in the morning mentioned that small farms do have larger diversity than big farms, yet stunting and malnourishment continue. How are we ensuring that smallholder farmers not only have diversity on their farms, but also consume the diverse nutrients from that diversity? Because maybe they are growing it, but maybe selling it for the economic returns and not consuming it themselves.

A: André Laperrière

I would like to jump in on a couple of points that are related to your question and also on issues raised before. Your question, fundamentally, has to do with nutrition. It just so happens that I'm coming back from a global nutrition summit in Cambridge, where we discussed the issue of nutrition and agriculture and how to make sure we don't just produce *more* food but rather that we produce more *nutritious* food; more important, that this nutritious food is *consumed*. In the discussions we found that there are multiple angles to this question. I would for instance like to mention infrastructure, and open data of course, as key to how politicians and farmers and consumers make more enlightened food choices.

We made a review of nutrition policies across the world, and we found a wide variety, of course. There is the typical policy which turns into limiting regulations on salt content, fat content; *taxation* to discourage import or the production of unhealthy foods. Then there are *financial incentives* for people to plant the right food, or to make it cheaper, to motivate consumers to buy nutritious food versus less nutritious food. You have to look at the value chain as a whole, not just one element: otherwise you're going to produce more food that nobody will buy, or you will create a demand that will not be fulfilled.

Infrastructure matters too because you might produce very nutritious food but, as we know, 30% of the food being produced in the world nowadays goes to waste before it can be consumed, and a significant part of that loss is even before these food products get to the market. So storage, transport, taxation, fiscal incentives, customs should also be looked at since they are parts of the ecosystem that influence food consumption patterns.

To make sure that our governments put in place the right policies, there needs to be the right data, the right information, readily available and understood, which is another point that was raised earlier. Just flooding people with data doesn't work, so it needs to be massaged and adapted to its audience, be it producers, policy makers or consumers.

My last point. We're talking about small plots, small farmers. What's important is that there's a wealth of data available out there, often clouding the key information the typical smallholder farmer needs. For example, he or she needs to know when it's the right time to plant, because 'November 9' doesn't work any more because seasons' dates are shifting because of climate change. The farmer really wants to know where is the best place to buy the seeds, or where is it best to sell the tomatoes or whatever he or she is producing. So the level of information required is very clear: simple, but critical. More precisely, farmers need accurate weather and market information they can use to maximise productivity, reduce costs and maximise income. Moreover, this information needs to be conveyed in a manner that will be easily understood and in a form the end user – the farmer – will rapidly become familiar with. SMS or verbal messages are typical of that. On the other hand, governments, CEOs, researchers need and will absorb much more complex and comprehensive data and will use it for a wide range of activities, themselves leading to a number of fiscal, health and infrastructure and agriculture messages. That's what I tried to demonstrate in my presentation this morning.

Q: Tony Fischer AM, *The Crawford Fund and CSIRO*

We haven't discussed seasonal weather forecasting, which is a 'big data' problem, a massive one. I've seen recent papers taking 50 years of rainfall records, daily rainfall records, and predicting monthly totals, 12 months out, and they're doing far better than global circulation models. If we could have decent seasonal forecasts we would have a huge impact on agriculture all over the world.

A: Andy Jarvis

Wearing my CCAFS hat (Climate Change, Agriculture and Food Security), I agree climate services, seasonal forecasts, are huge. We have great experience, for example, in sending out simple information. Climate scientists get obsessed about skill and uncertainty – but farmers often need pretty simple triggers to make a right decision. Just knowing when the rains are likely to come can be transformational in terms of the management practices they can then employ. So yes, I think seasonal forecasts and getting that more dynamic information into extension and into rural radio stations is crucial. And it is 'big data'. The regional models are not performing half as well as the empirical stuff just using trends and indicators.

Q: Tim Reeves, *The Crawford Fund*

When I was Director General of CIMMYT, molecular plant breeding was just coming in. We did an economic assessment of whether we could breed more cheaply with molecular techniques and we found that it added costs to our breeding systems. It wasn't until the breeders changed the breeding systems to

be molecular-based right from the start, that it became cheaper. I'm thinking about the same thing in relation to data collection. At the moment we're adding it on; we've grown the crop and we're monitoring it and finding out lots about it and what's happening, etc. I'm thinking, a real disruption would be where you actually *design* your farming system because of data that you're able to get in real time – the measurements of soil mineral nitrogen, water, or tipping points that make you choose one enterprise or another. In other words, basing the whole farming system on data you've got *before* you begin, rather than adding on. And finding that you actually get a cheaper and better solution.

A: Andy Jarvis

Yes. Good point.

Chair

Thank you to all speakers in this session.