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Q&A: ICT adding value for smallholders

Chair: Dr Joanne Daly PSM

Crawford Fund ACT Committee member & CSIRO Honorary Fellow

Q: Joanne Daly, Chair

What do you see is the greatest impediment to the uptake of digital technologies by smallholder farmers? Is it the applications? Is it access to devices or networks? Or is it something else? Perhaps David would like to start?

A: David Bergvinson

I think it's country by country. The context of that question varies. Access in many parts of sub-Saharan Africa still is an issue, especially the cost of data. We talk about 'big data' and distilling it, but at the end of the day it's still data, especially when it comes to imagery. The cost of data through mobile providers is a constraint for farmers.

A: Stuart Higgins

I'd concur with that. For the work we were doing in Papua New Guinea, with five projects, the data is really limiting them. Tablets are an upfront cost, but the data is very expensive there. That's on the farmers' side. On the researchers' side, they also have that problem around the cost of data, but what's holding back researchers in countries where we're partnering with research is the training and the knowledge of how to build these simple apps. That's probably what's needed next.

A: Andrew Mude

I would say it's time. But I'd also agree, in this context, the cost of data, and also access to mobile phones themselves. I mean, we've seen a big increase, but the phones are basic, and smartphones can use more applications. That can serve both farmers and their representatives or policy makers, and it will take time before there's a critical mass of people – in the context that I'm working on, pastoralists – who have these. But in the end I'd say the limiting factor is the cost of data.

Q: Caspar Roxburgh, *The University of Queensland*

Great presentations. I suppose this question is really directed to David. I work on an ACIAR-funded project in Africa, and part of my role is to work with an ICT tool for communicating project results and findings to farmers. Something that I've learnt and discovered, talking to other people doing similar things with other projects, is that these tools require quite a bit of financial investment to build. They require quite a lot of time: ongoing time to help update them, debug them and keep them functional and relevant. And they also require multi-disciplinary teams, because you need IT developers, and you need researchers to help formulate content, and you also need communication specialists to understand how to package the story. I'm interested in what you see as the CG System's or

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

maybe just ICRISAT's view on how to manage this investment. Because if you're a researcher and your job is to, in part, work with these tools, you're working on something that is not a traditional research output, and it comes into conflict with your own requirements to publish and conduct scientific research.

A: David Bergvinson

I agree, thanks Caspar. Yeah, great question. That's actually why we started the ihub, recognising that researchers have a lot to offer on insights, but that delivery of the knowledge and sustainable solutions really requires entrepreneurs. So what's happened with ihub is, we've brought in that ecosystem of disciplines to not just design and develop but also deliver those solutions faster – and, I would even submit, at a lower cost. So I think that kind of innovative thinking needs to happen around the world where this intersection of research and entrepreneurship needs to be supported. I think if you do that you'll find that the return on investment is high.

A: Stuart Higgins

I'll add one comment to that. In the MAD research series that we are doing, which wraps up this month, as part of that research we are evaluating quantitatively the amount of time researchers are spending in transitioning from paper to apps. We've been monitoring that with them. We've been monitoring the amount of time AgImpact, our support team, is spending in supporting those projects, adopting apps. We've also been evaluating the amount of dollars that they have had to spend in adopting apps. Those findings will be out in the next month or so. We've spent the last year doing that with nine research projects, four of which are core projects. I think that was a very insightful question that ACIAR posed a year ago, for us to have some of that information now, so that people can really understand what they are getting involved in; whether this is going to cost them a lot of time, a lot of money; and so on.

Q: Joanne Daly, Chair

Andrew, do you have a comment on how to achieve the balance for researchers between research output and building and sustaining these applications?

A: Andrew Mude

I would echo what David has said, in the sense that, even as we have developed these applications, the importance of the partnerships we have formed with commercial players – those who would benefit from the applications, as well as those who make the applications – is quite important because there are synergies gained by the contributions that each can make. And also for researchers, as has been indicated, there are a lot of benefits that we get from the increased access to information, high resolution information, which can really increase the value of the research we do and the insights we can deliver. So I really think harnessing these partnerships is essential.

Q: Ros Gleadow, Monash University

My question is initially to Stuart, but the others may like to comment as well. With the increasing use of social media and posting of photos, there is so much data out there and available already on social media which you could

be harvesting and adding to your data sets, rather than having specific apps. Is there a move to try and use some of that via an app that can gather existing social media data?

A: Stuart Higgins

I have to confess I'm a social media dinosaur. Fortunately, the people I work with are more social media savvy. I know of one ACIAR project, which I think is in Vietnam, where they are using social media in collecting data as well as in communicating. I'm sorry I don't have much information on using social media to collect the data and how that would happen.

A: David Bergvinson

Yes, I think it's going to become increasingly important, not just in collecting the data but actually within communities of practice, to share the knowledge that comes from that data. Facebook is quite keen on this. Another company they acquired, Whatsapp, is being used in many parts of the developing world as closed loop social media for supporting rural development. So I think you're going to see social media used in different ways, both for public data but also private data.

A: Andrew Mude

I think it really depends on the type of data that you want to be collecting. Social media and all these forms of generating data will generate a whole bunch of data that sometimes might not be of value, so you really have to be thinking about what the application is. For example, in some work we've done with pastoralists, it's really important for us to understand their movement patterns, and understand if the provision of insurance or other interventions will affect their movements. About four years ago we had a costly project in which we collared a few cattle and those collars of data collection were quite expensive, but now we can use pastoralists' phones, their phone signals, to track their patterns of movement. Now the challenge is access to that data and ownership of the data, and that's something that will be increasingly important to think about, because you can't just make use of that data without subscribing and requesting or acknowledging its use.

Q: Roger Wickes, *The Crawford Fund South Australia Committee*

One of the big issues is privacy of the data. You are collecting more and more data. I've worked out that the supermarket chain knows what I buy, what I eat, where I go and how much I pay for most things, and how much I drink, and that's starting to be a concern. You're collecting data about cattle on individual properties. We had a protocol in soil science about lifting that to a level where you can use it. Are there any protocols for your uses? There doesn't seem to be much protocol around privacy.

A: Stuart Higgins

I can touch on that briefly. Last year we had a masterclass in Canberra and one of the sessions was on ethics, and the ethics of digital data collection. There's an information pack on that. So we have certainly covered that topic and explored it with the research projects that we've been supporting through ACIAR. The

technology that we've been using has been widely used in the healthcare area, so it has the highest level of security. Interestingly, we've found the least secure aspect of data collection is the person walking around with a tablet, without a security code or a lock or something like that. Yes, I am concerned when I look up something on the Internet and suddenly I see ads for it for the next week. It is a concern.

A: David Bergvinson

I think this is a good question, and as a community we really need to come together quickly on this, at least to form guiding principles and certification of organisations that comply with those principles. It is actually a very complicated issue. We can draw on the examples of the health sector, but then it can be like the precautionary principle in that you are so cautious that you cannot unlock the value of the data for the customer. Finding that balance is really important, and it depends on the type of data being collected.

A: Stuart Higgins

If I could add one more comment to that. What we have experienced over the last year and a half is that you may have a project that is looking to use digital data collection, and participants will be enthusiastic and their in-country partners will be very enthusiastic. But I would strongly urge project teams to be discussing the matter with the higher level in-country partners, asking their views around data security. Because that will very quickly slow down the adoption process unless you manage perceptions – and not only manage perceptions but also inform them. We encourage those questions. It means people are really thinking about what they're doing. Projects looking to use data should have those discussions sooner rather than later because the reactions can often be a last minute surprise.

A: Andrew Mude

As researchers, one of the things we typically have to follow is research-ethics compliance. I think for those of us now working with this new type of data collection it is important to think about what research ethics would look like, and not just research ethics but, because the accessibility of the data makes it so much more widespread in its use, also the ethics related to the generalised use of it, beyond just research.

Q: Ernest Bethe, *International Finance Corporation*

I have a question for all three speakers. At IFC, we invest in companies, private companies and then we work to link these private companies with smallholders. What we see, or what I see (maybe others see something different) is that in a lot of the countries in which we work, the public extension service and public research are declining relative to the amount of private extension or private touch points. Stuart, in the project that you did, and David in what ICRISAT is doing, and Andrew within IBLI, what is the involvement of the private sector? Are you looking at how these mobile acquired devices can be used by them, and then comparing that to the public side?

A: Stuart Higgins

In AgImpact, outside of our work with ACIAR, we also support the private sector in the adoption of digital data collection, and it is growing very very quickly. They are using it for pure research and they're also using it very much for their logistics and their supply chains. Although I would say they are behind the 'research curve', they are certainly really taking this on.

A: David Bergvinson

An area of greatest growth is the private sector's use of these tools to better serve customers. I think that, from the perspectives of donors to the CG System, there is an increasing recognition that the private sector is going to be key, with sustainable scaling of solutions for smallholder farmers within commodity catchments, and integrating services. We heard Mario Herrero [Session 2 this *Proceedings*] speak about mixed farming and how we grapple with the complexity of this. The private extension systems are increasingly taking up that role, largely because governments are not investing a lot in public extension services. I think it is a critical question to be asking policy makers: What are the incentives to further catalyse private sector extension, but in a responsible way so that information comes back?

A: Andrew Mude

Within my program, in order to deliver insurance, we recognised it needed to be market-mediated. So we have been working very closely with insurance companies and with other aggregators. In Ethiopia we are now working with a financial company – a digital financial infrastructure company – that is working to deliver not just insurance but also finance and other types of agriculture extension services. We see more and more of this happening. Also among my colleagues at the International Livestock Research Institute, and also I think in other parts of the CG System, there is greater encouragement to work with private companies, particularly since we are told more and more to think about impactful research, and to think about scale. So it is becoming more critical to recognise that you need commercial players to help drive the products and technologies of the science that you develop.

I would say that even the donors are encouraging this. More and more donors are coming online, and even traditional donors are starting to have an increasing pool of resources directed at developing and encouraging partnerships with private companies, or even requiring private companies to take the lead in partnerships with research agencies and NGOs and so on. So there is that movement going on.

In regard to extension, in the field that I've been working with, I see a lot of healthy collaboration between public and private. For example, I mentioned development of sustainable market systems. This was a government function but they have realised that they might not be the best suited to actually collecting and disseminating and distributing good data, and so we are working closely with companies who might be better placed, such as Safari Corp. So I do see this trend happening, and I think it can be positive for both public and private.

Q: Guy Coleman, AgriEducate

We have heard recently from Dr Akinwumi Adesina, who was the World Food Prize Laureate in 2017, about making agriculture a really cool choice again for youth, and also from Dr Lindiwe Sibanda last night about Africa being the youngest continent in the near future. I'd love to hear your thoughts, from David and also Stuart and Andrew, about how we best capture this youth engagement effectively and capitalise on perhaps an ever growing opportunity in the future?

A: David Bergvinson

Well that was one of the intents of iHub, to get youth involved in the design, development and delivery of these solutions. They know the constituency they are trying to reach out to, because they are in it themselves. That's one avenue. I think another is that we need to support entrepreneurship training in rural communities, so that we empower youth in rural communities to see agriculture as a viable business and to be thinking about ways in which they can respond to market opportunities. I don't think that's really instilled in many universities or high schools around the world, and it is very important. And a third way, I think, is by making sure that we have a policy framework that supports this as well and creates the awareness and provides the right incentives for youth to be looking at agriculture as a viable business. Different countries are approaching this differently, but I think it's an issue that has largely escaped the attention of policy makers. When you look at the average age demographic of farmers around the world, whether it be in Australia or Angola, you're going to be shocked. I think it is something we need to urgently address, and I believe that needs to start in the school systems.

A: Stuart Higgins

I talked about this for many years when I was a youthful farmer. My view is, we all want to make a difference, no matter what age we are. My understanding is that the youth of today want to make it bigger and quicker, and I get that, and that's great. For me, what appeals more, or the way to appeal more to youth these days, is by creating or promoting that link (we heard about it last night) between health, the environment and food security. It's not just agriculture. If you want to improve someone's health, get into agriculture. If you want to improve the environment, get into agriculture. That's been my catch cry for a few years: if you want to solve a lot of the world's issues, start working with a farmer.

A: Andrew Mude

I was interested in Stuart talking about moving from farming to international research. I don't know if I'm still counted as youth but I'm thinking of moving the other way. Probably my sample is not very wide, but I do feel that one of the key things is really to demonstrate to youth that farming is a viable alternative livelihood that can generate a substantial living for them. I think that message is getting around. In Kenya I see more and more popular information out there. For example, in the regular newspapers there's a segment called 'Seeds of Gold' once a week and it is one of the most popular segments. Youth, as you said,

are the ones accessing information through social media so I think that will be very important. I know governments in Kenya, both the national and the county governments, are providing access to finance for youth and youth groups for agriculture, and providing more support to them through agricultural innovation or accelerators in Ethiopia and in other places. So I think, with an increasing attention to delivering information on the value of agriculture to youth, probably you'll start seeing an upswing in youth looking into agriculture.

A: Stuart Higgins

Can I just add one comment ... What the Crawford Fund does by having its scholars and their mentors, that is what is needed. When I first started being a young farmer, the mentors that I had were incredible. The more mentoring that can go on, the better. If you sat me in a room with a young farmer for half an hour, I reckon I could nearly convince them that farming was the way to go.

Q: Zelalem Moti, PhD student, University of New England

My question is to Andrew, about local context, how it really affects the new digital applications for smallholder farmers. Andrew mentioned some of the challenges, such as access to smartphones and also digital literacy. I know for example in Ethiopia they are using a lot of languages with the smallholder farmers, but maybe it's not a problem in Kenya, where most of the farmers also speak English and handle smartphones. I want to know more about how this local context is affecting the use of these digital tools among the smallholder farmers.

A: Andrew Mude

This is a really important point and you are right, particularly in Ethiopia. I mean when we're talking about developing mobile content or even e-learning content for training insurance company executives and agents, training the local government extension workers, and so on, in Ethiopia we have found that we needed to adapt our content in terms of language. The English language curriculum was not effective. We had to develop a specific Ethiopian language product, and change not just the language but sometimes also the type of scenery, the type of illustration. The same is true in Somalia, where we are now working. In Kenya, it was a bit different: I think most of the literate people speak at least English or Swahili so we were able to limit ourselves to those languages.

I mentioned earlier about the work on the mobile learning and how the initial resource got the insurance companies really excited. We had one insurance company that had mandated all their agents to go through the end-learning course it required for certification, but half of their agents were not digitally literate, so that became a problem. That resulted in a change of agency and a change in the requirements of what incoming agents had to do and, in this case, that digital literacy would be required. So context is something that is important to think about, and who your client is. Sometimes the client is not just a farmer but the service provider to the farmer. You're right, these are issues we need to be attentive to as we develop content.

Q: Wendy Umberger, Centre for Global Food & Resources, Adelaide

My question is directed to all three speakers. I think you mentioned that uptake of smartphone technology has been incredible in this last decade, and that while researchers are using this technology to enable their research and enhance smallholder livelihoods, the people sitting in higher authorities in power might not be as enthusiastic and as excited to use this technology to collect data. How do you think we can effectively communicate the relevance and use of smartphone technology to those people high up there, and make use of it?

A: David Bergvinson

My short response is the real-time dashboards, that design pragmatic policies to serve society.

A: Stuart Higgins

I'd certainly support that, showing them the value. They are probably not aware of the value right at this moment.

A: Andrew Mude

I think, as Stuart and David both mentioned before, that it would be important to integrate some of these stakeholders, the high level stakeholders, from the start of your project. In our case, for example, both for livestock insurance and livestock market information systems, the government, after being convinced, has come on board and is pushing for the development of these types of services. So I think, even though the more senior members of society might not be as digitally savvy, I still think they are aware of the impact that smartphone technology might have. Given this is the objective, I think bringing them online and demonstrating to them the value, through tools and dashboards as was mentioned, should help convince them and draw their support.

Q: Joanne Daly, Chair

Thank you. I think also, delivery of results and community demand ... that is what people higher up the 'feeding chain' often respond to, isn't it.

A: Stuart Higgins

And if a young scholar has excellent data presentation skills, I think you will find that will be in more and more demand in the years to come. The better you can communicate this massive amount of data, the better you'll be looked after.

Chair

Thank you to all speakers in this session.