



# HELPING SMALLHOLDERS MAKE THE MOST OF MAIZE THROUGH LOANS AND STORAGE TECHNOLOGY: EVIDENCE FROM TANZANIA

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QUESTIONS AND ANSWERS AUDIO TRANSCRIPT

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## **PRESENTERS**

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## **MODERATOR**

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*Julie:*

So I see we've got some hands in the room; we also have some people online. I wanted to quickly pass it off to someone I tapped for our first response, Ahmed Kablan with the USAID Bureau for Food Security and then we'll move along to some additional questions in the room. So I'll pass it over to Ahmed first.

*Ahmed Kablan:*

Thank you Julie and thank you – thanks for the presenter for sharing with us their findings and thank you USAID for organizing this meeting and for funding this work. I mean as you know food service loss is a critical part for our food security. Ourselves by 2050 it is expected that we need to increase food supply or agricultural productivity by about 48.6 percent. Food post-service losses and food waste contribute as much as – more than 30 to about 50 percent in the highest estimate. Even with the lowest estimate it is food produced not being consumed and that could be utilized to improve our food security in the future.

The food post-service losses and food waste are critical also in terms of where we work in and food security and nutritional outcomes because food loss is food not being used to be sold in the market and to generate income, it's not food to consume, so it's affecting food security but also then nutrition, nutritional outcomes, especially in the lean season. And not to forget post-service losses, they are not on the quantity being lost but also on the quality of the nutrients being lost in the food, especially when we are moving toward more high-value crops, perishable crops that are also rich in nutrients so improper storage and handling of the food contributes to lower in the quality.

And as Jacob mentioned the food safety angle for it, the application of highly toxic pesticides or insecticides in order to stop insect infestation that also represents a food safety risk and not to forget these crops or application of this highly toxic insecticide does not stop fungal growth and in maize and ground nuts and other mycotoxins, is a higher risk. So storage or improper storage such as the jute bags that are commonly used, cheap bags as Jake mentioned, they don't really stop the growth of mycotoxins. Aflatoxin research, research from the Post-Service Loss Innovation Lab, the Food Processing Innovation Lab at Purdue University, this showed efficacy of the PICS bags in reducing or preventing the growth of fungal growth because it created a hermetic environment inside the bags. So that is another advantage of the PICS bags and importance of applying credit to any able farmers to purchase these bags and use them.

The other things, I mean linking this work will be critical with other research investment that we have funded by USAID including the Post-Service Loss

Reduction Innovation Lab at Kansas State University, including the Food Processing and Post-Service Loss Reduction at Purdue University, I think you are linked with Professor Betty Bugusu at Purdue, including some of the work that has been funded with our – from BFS also and at different storage methodology and efficiency to reduce mycotoxins, the MIT site work that's funded by the Global Development Lab, and several other works and I really did not know if they have funded or are funding some work related also that contributes at Julie mentioned to food security and emergency and the resilience work that's linked to the reduction of post-harvest losses.

Again it is a great work and I don't want to take too much time. I see a lot of excited people who want to ask questions and ask I have the mic I'm going to ask the first question. On the figure that you showed about the lone utilization Hira you showed there is 1 group about 25 persons who use it for household expenses, which is the second biggest group that use it. So did you check the amount if there was more food stored when they're using the money to be for school or for other expenses, which means did that trigger less urgency to seal the crops and store it for a later period of time hoping to get more money and more sale and of course if that did not – the ban on export was not placed maybe they could have achieved that if that was the case? Thank you.

*Hira:* Thank you so much for your comments and the question. So just for clarification before I answer, we will be going back for an inline survey in May and we will be able to get more specific answers to your questions, but like from when I was there and from anecdotal evidence, yes. It absolutely means that you do have more maize to store for yourself and you know – yeah. Does that clarify? But yeah, hopefully we'll get more specific answers when we go back in May. Thank you.

*Jake:* And also let me – oh, it's on. Good. I'd be happy – so we're definitely involved on the drying side of this with the food processing lab at Purdue, I'm involved with that, and that's an important component and I'd be happy to hear more about some of the related activities that are going on that USAID is involved with.

*Julie:* I saw some up front so I'll pass to you and if you don't mind let us know who you are.

*Audience:* Hi, my name is Bill Scott. I'm with Dexis Consulting Group. I was very curious to know what was the reaction of the banks who have a lot of money to extend credit and also the trader communities in these PICS bags? I mean this is sort of a seed change for them. They've got less food loss in the system. How can you work with them and what did they say?

*Jake:* Thank you. That was a great question. We've seen – so in Tanzania we worked with this local NGO that seemed to be – that's a bit more flexible than a larger bank. They actually borrow from Opportunity Bank so they distribute credit to the groups through that bank as part of this. So the local NGO has been pretty flexible in offering this loan. In Malawi we're working with a more formal bank, First Discount House Bank. They're willing to do it and they have probably tighter safeguards in place to get the money back but maybe they're a little bit less flexible.

So I think that banks are realizing that there's an opportunity here, that these groups are a potential market, and hopefully this project can show that it makes sense and it's worth some of the risks that are out there, that these people can be credit-worthy if they're part of groups. I think again 1 of the things with Malawi and the desire to focus on legumes was they saw it as more high-value. The people that grow legumes are probably a little bit more commercial-oriented and they expect that they'll be able to get their money back.

And then traders – so 1 thing that just anecdotally we've seen, if you're just buying maize to sell it quickly the PICS bag probably isn't for you. It's not a trading bag. It's a storage – it's a grainery essentially; it's a storage structure. But the people who are growing or buying to store it makes sense. That's sort of the market for this.

*Julie:* Let's hand it back to our online audience before we come back to the in-person.

*Participant 5:* Yeah, so we've got over 100 participants dialing in today from South America to Sub-Saharan Africa with lots of questions and we also had **Dieudonné** who I think was from Purdue as well who was helping answer a lot of these online but still have some lingering questions on here. There were a few questions around some other things that could potentially penetrate the bags like large borers and rodents wanting to know if the bags were resistant to that or if that was an issue.

*Jake:*

Well Dieudonné can maybe respond in the chat if I say something wrong because I'm an economist, but the PICS bags, from the – what the entomological research has shown is that if you have larger grain borer on the inside of the bag they suffocate too. They can't get through the double layer so it is effective against the larger grain borer, which is a very aggressive pest.

What you need to do to prevent insects from the outside coming in and rodents as well is the recommendation is to store it on wooden platform that's a little bit elevated off the floor and make sure your place where you're storing is clean so that you don't have loose maize kernels lying around that will attract rodents so they start sniffing around. But what we've seen is that if it's a clean area and you store PICS bags with other PICS bags and not next to a non-hermetic bag that the rodents and the insects can attack it will keep away rodents and will prevent insects from coming in from the outside so that's an important part of the training as well.

We did some follow-up for example in Uganda where we'd done the training and then we went back and we saw that most people – we looked at how they were storing and where they were storing and most people got the message and were storing it in a safe, clean location and didn't report really too much rodent problem.

*Julie:*

More questions from our in-person audience. I think there was 1 over here, yes.

*Audience:*

Yes. I'm Tamara Dogleby and I'm 1 of the evaluators for the Innovation Lab projects, which have been implemented in Africa and 4 other regions aiming at reducing risk for farmers and increasing their yearly surplus and investment. And I wanted to know what was the chief mechanism for working with people in groups? I know you had them organize these savings groups and they were in the same communities obviously but were there any other contacts, any links between them? Were any of them part of producer groups?

*Hira:*

So these groups, they were already existing when we went in because they had already been working with them. The average length of these groups is like 3 years. Their primary purpose is like to promote savings within the group and then to create this pool of money that anyone who needs it can then borrow from. Some of them do also do producer activities but actually you know like in some of them there are concurrent groups that focus on production for example. These groups primarily,

they are like savings and yeah, exactly, they're linked through communities, through families, and things like that. But yeah again, we did not bring these groups together and that's 1 of the reasons why we worked with them. They had these groups established and they'd been there for a while. Thank you.

*Julie:* Another question from our online audience?

*Participant 5:* Sure. We had a number of questions around sustainability, what will happen when the project is over and what was designed as an exit plan here.

*Jake:* Thank you for that question and Hira can add on this as well. We're working in Tanzania with the NGO to understand some more of the challenges and their interest in doing this again and Hira talked with them when she was there in December and I talked to them in October. They say they're interested in doing this again, which is great. They may shift the focus a bit and find the groups that were the easiest to work with to lend to. I don't know how exactly they're going to do it but they say they're interested in doing it.

One thing they may do is there were some – some people said, "We wish we got a bigger loan," so \$40 wasn't enough. They may make it a little bit bigger to the people that they choose to work with and they also actually felt inspired to offer for different groups, not the people that were part of this, they offered input loans to people so they did actually expand their product offering this season for people. So hopefully we had some impact in encouraging them to try some new things. But we are working with them to expand it and our project manager Bernadette is very innovative and assertive and she's looking for some other potential lenders who might be interested in these findings and interested in doing this. Do you want to add anything?

*Hira:* Yeah, no, absolutely. I think everything that Jake said – I think you know like the PICS bag like this, they really believe in the bag and you know it's true they've seen it, it keeps the maize safe, so they see it as good collateral. And when I talked to them they're really excited about it. One of the things also like Jake mentioned in Malawi, they are also depending on what area they're in of expanding like the loan to different products like legumes specifically so – yeah.

*Julie:* Great. We've got about 20 minutes left for questions so we'll keep going with an in-person question.

*Audience:* I'm Mark Mitchell with Land O'Lakes. I didn't hear you mention any of the costs associated with the transport and storage of the collateral grains. Who ate that cost and what happened if you had any storage or accidental loss like the storage shed burned down?

*Hira:* So as far as storing the grain that was borne by the groups themselves. Most of them brought it together in like a central location, which was nearby where their farms were. We had 1 incident specifically where you know there was a problem with a batch of the bags unfortunately and there was a loss so that involved negotiating with the, the lending – that was 1 instance. Another instance was – and you know that's when I say when like the people - farmers really likes this technology because it keeps the maize safe. So in 1 case the groups did not want to repay the loan; there was an issue with the price. In that case they basically got somebody to come and buy the grain and that was essentially at cost so they didn't make any money off of it but there was no loss associated with that either. I don't know if you want to add.

*Jake:* That's good.

*Julie:* All right. I'll shuttle it over here.

*Audience:* Thanks Julie. Thanks everyone for the great presentation, Patrick Star, USAID. This is sort of a half-baked question but I'm wondering if you've studied any minimum necessary percentage, maybe price swing between harvest and the peak sale price to understand what kind of crops may be best suited for this model, especially given the price fluctuations that may not be quite as pronounced for other maybe commodity crops and so forth and then especially when you layer on the interest rates that are applied to loans and different enabling environments that maybe in Malawi might be a little bit different than in Tanzania could make this maybe a non-sustainable model? So that's my question.

*Jake:* Very good question. We certainly did analyses of break-even with maize. We generally – at least I generally think of maize first as the food security crop and that's the one that's going to have the biggest impact and what we should target so that was the mentality going into this. But again as you said and as we said, legumes, the profit potential may be much higher.

Based on our scenarios and what was lending at 12 percent and the price seasonality that we'd seen we assumed that there would be profit and there may still be profit; it just may not be as big as we've seen. I think you know it's probably worth maybe something that comes out of this – sort of a simple playbook analysis of where the break-even given this interest rate and the potential price fluctuation what kind of price fluctuation do you need to break even and make this profitable? I think that's a good recommendation for something to come out that others could use in the future.

*Julie:* All right. Let's send it back to our online audience if there's another question and then we'll come back to this table.

*Participant 5:* Sure. There were some questions about the details around the loans themselves, if the loan was fixed at \$40 USD or what the loan to value ratio was, also questions around the use of mobile money for loan disbursements and how that worked, what the challenges were potentially, and plans for the future?

*Hira:* So for this intervention specifically the loan was fixed at \$40 US dollars and like as Jake mentioned and like I also said these groups are really acrogenous so hopefully if they goes back there's probably going to be a lot more variation in you know the amount of the loan and who they give it to. So the mobile money – so in December we actually physically went to these locations to talk to as many of these groups as possible but you know like right now it's the rainy season for example so some places are just inaccessible to go to so that's when something like mobile money is really nice because you can communicate on the phone and they've seen the face, they know that \_\_\_\_\_ is taking it seriously, so then it's like it's a much more low-cost and easier way to get people to pay back and it allows for greater flexibility because people have now because of this price issue some groups have been paying in pieces.

We'll pay half and then we'll pay the rest of it later so mobile money is really great there.

*Audience:* Hi, my name is \_\_\_\_\_ with \_\_\_\_\_ International and my question is about the PICS bags and the drying or moisture content of the grains. So what I've observed is that in the countries where they have 2 or more agricultural seasons in the year you would realize that they would have a shorter period that the grain can remain on the farm to dry because the rainy season will kick in very soon and so they have to harvest and dry using other means. And if they don't have the appropriate drying equipment to use then the quality of the grains are actually affected from the drying stage even before it moves into the PICS bags. So did you have this challenge? What was the agricultural calendar or planting season in Tanzania like and if you did how did you go about it? Thank you.

*Hira:* So this area that we're working in specifically it is unimodal, there's just 1 season, so like right now in December the planting starts and the harvest approximately begins in May and June and I think Jake will talk more about that.

*Jake:* And of course I mentioned briefly, talking about drying is a big part of the training because you want the grain to be dried of course before it goes in the PICS bag. If there's mold or if there's any sort of fungi growth and it's dried below 13 percent it won't propagate any further in the airtight environment if the bag is closed properly, which is important. If it's too wet and it goes in the bag it may ferment because you have this anaerobic environment. But there's no question that drying is a big problem and in our Food Processing and Post-Harvest Handling Innovation Lab along with the Post-Harvest Loss Innovation Lab and a number of other projects are trying to figure out the drying problem and how do you cost-effectively dry grain quickly and it's a big challenge.

For most people they're not at a scale that it makes sense to buy a dryer. How do you get a dryer that people are willing to pay for? What we've seen in our work in Senegal and some work in Kenya on this issue is for a lot of people the most cost-effective way to dry is just to have a tarp or the roof or some place clean to get it off the ground, prevent fungi contamination, and try to dry it in the sun as quick as possible and get it in a good storage structure. Somebody – we had a colleague at Purdue that came up with a low-cost moisture detection device that's about \$2 that

you can use to tell if you put maize in a bag – it's called a hygrometer. If you put maize in a bag for 15 minutes it will equilibrate and give you a reading to tell you if it's below that 13 percent level that you can safely store so it's a low-cost innovation and we're trying to disseminate that as well but there's no question drying is a big issue.

*Audience:* Can you hear me? Yep? My name is \_\_\_\_\_ with Fintrac. Thank you very much for a very comprehensive presentation and I wonder if you could discuss a little bit about the different levels of uptake on the bags and then on the use of credit available, specifically the bags apparently were at 100 percent uptake but credit not so much. Was this an issue of the size of the credit or was it the terms for repayment? And I understand you are discussing this moving forward in Tanzania so if you could discuss a little bit about that...

*Hira:* Thank you for your question. Yeah, so the loan uptake was around 80 percent so from what I understand from your question is essentially why those 20 percent did not want the loan. Yeah, there's a variety of reasons so some of them I know were trying to negotiate a lower interest rate with the credit group and when that didn't work out they were like, "We don't want it." In a couple of cases they felt like they did not need the credit and they would have liked a larger loan and that this was too small. Yeah, those were some of the reasons I think for it.

*Jake:* On the PICS adoption, yes, in this intervention since it was a new product we did offer 100 percent subsidy so it was a free bag for people so they were willing to try it. What we've seen, and I mentioned this at the end, is in the places where we followed up on that where we randomly gave people a bag those people were actually more likely to go out and buy a bag commercially than the people who'd just been trained and hadn't received one so again it's like this idea of a new product. You're providing a free sample essentially and then you're stimulating the market.

What we've also seen just in terms of adoption numbers is for example in Uganda where we baseline surveyed in 2014 and nobody had used the bag basically in the sample or heard of it and then we did our awareness building, our demonstrations, our extension activities and then went back 2 seasons later. Adoption was at about 6 percent in the places where there had been training so in terms of you know of course we'd love to see it higher, but in terms of just a 1 calendar year, 2-season

adoption rate it's pretty good if you think about how long it's taken for some agricultural technologies like hybrid seeds for example to get adopted.

We've seen in Kenya for example after about 2 or 3 years hermetic storage in western Kenya where we did some sampling is about 7 percent of people have 1 bag. In Nigeria where it's been around for about 10 years we did some follow-up surveys last year and adoption is pretty high, about 15, 20 percent so it's making an impact but of course like all innovations it takes some time.

*Julie:* I'll send it back to our online audience but we'll get you next so 1 more from our online.

*Participant 5:* Sure. We had a question around integrating potentially a warehouse receipt type facility and if that was something you considered doing or any thoughts on that to link the financial institution to a collective storage facility for the bag grain.

*Jake:* Yeah, that's a good idea and it's certainly come up. One of the things when we've looked at warehouse receipts, it's hard for the smallholder to access those in the sense that they don't have that much to store. They've got to take it to some location that could be some distance away and then they're losing control of their food supply. So 1 of the things people like about those PICS bags is that it's your food in your bag and you can store it in your house away from people who may want to ask you for some of it or could steal it so you can keep your food supply safe and that's a nice thing of the bags compared to the metal silos. So for the smallholder the population that we're working with and that would be interested in the PICS bag I mean I think there is some potential but it may not – the warehouse receipt system may not be the primary storage vehicle for them.

I think what has been good in this project, especially with the loans, is this idea of this group storage place so with people you trust. You put your maize in a safe place like the treasurer of the group's house or in a community place where you – some kind of central location where you have a locked door and people of course keep their own maize with their own name on the bag so we know it's this person's maize but it's stored collectively as collateral. That may be more accessible to the smallholder population.

*Hira:* Yeah, no, just that I think for the sample that we are working with like logistics and cost-wise it is really difficult to go to – because Tanzania does have a structure like this but none of the people in our sample were involved with that. And that's the good thing with working with them because they knew these people so it was stored in a central location, you know like Jake said either at the treasurer's office or in like a local government office so it's visible to them and then it's visible to everyone whose grain it is.

*Audience:* Hi there. My name is Stan McMahon and I'm with Fintrac. We've worked a lot with PICS bags in our Partnering for Innovation Program and the CAVES project in Kenya. Jacob I had a question for you about the harvest day loans that you were talking about at the beginning, which seemed to differ from the \$40 product that you were mentioning later on. Have you run the numbers on how margins are affected for farmers when they do take out that harvest day loan in a more typical year, 1 that sees more price fluctuation throughout the harvest, months after harvest? Have you run the numbers on how margins are affected and how much farmers can see an increase in their margins when you account for the repayment of the loan and the interest?

*Jake:* So let me clarify. I mean the idea of this loan was that it's a harvest loan that they got at harvest, at or right around harvest that they could use to pay expenses and then store. Is that – are you thinking of a different type of loan? I mean that's the idea where you borrow against the present value of your grain at harvest, which 200kgs was about \$40 in this region. So you know we figured if the – on an average year, so \$40 you're paying 12 percent, that's let's say \$5 or something, and then you can – the price will almost double, you can certainly make \$35, let's say \$30 or something in profit, \$30, \$40 in profit on that so it should work in a typical year. Even with \$5 interest or something to that extent you should be able to make it happen. And again we may – I think we'll see profit for a number of people but it just may not be that high.

*Julie:* All right, we'll take 1 in the far back.

*Audience:* Hi, I'm Shaylee with Bank U. We're a block chain as a service company and we're exploring similar kind of use cases in various countries. Can you tell me what kind

of technology the NGO was using, the bank was using to kind of monitor all of what was happening and kind of whether you think it would've made a difference in reducing the interest rates?

*Hira:*

Thank you for your question. So there are a couple of things. So the primary way of monitoring is like 2 reports from the network of employees in each district so the way they're structured is they have their head office in \_\_\_\_\_ City, which is the main city in region and then they have 1 coordinator in each of these districts and then depending on how big the district is the coordinator has like 1 or 2 people who work under him or her.

What they did was it was because of this project and other projects was that each of these coordinators had smart phones and you know sporadically so other than checking up with the coordinators on the phone they would send the pictures of when the grain was stored, whether there were any issues, and things like that. That was primarily how they monitored and I think you know a part of it is that they knew these people well, the groups are also well aware that they will work with the government on other projects so there's like benefit and incentive on both sides to keep a good working relationship and that's what they relied on primarily. Thank you.

*Julie:*

All right, I think we have time for 1 last in-person question and I'm wondering if there's 1 from someone who hasn't asked 1 yet? No? All right, well I will send it over to Kristen.

*Audience:*

Kristen O'Planick, USAID. I was just thinking about the credit constraint issue and as you were saying the risk in terms of agricultural credit. And I know we've seen success in some of our other activities where they've paired loans with insurance products and I was wondering if that's something you had considered. Obviously the availability of the insurance product is the first issue, but just in terms of consideration, especially vis-à-vis Patrick's question with what the price floor would need to be for all of this to work and if you could have an insurance product against that price floor that could be a very interesting solution, not an easy one I'm sure, but just something if it had any consideration there?

*Jake:*

So that's an interesting question. So you're saying basically sort of insurance on the price, like a revenue type insurance, not an index weather insurance. Yeah, I think that's really an interesting question. If people would go for that or if they'll just take their chances, I mean it would be interesting to see what the uptake of that would be and I think that's really interesting combined with the loan and the PICS bags if we could look at that. It wasn't something that we considered. We had our hands full implementing what we had but it's a great and yeah, for future research it's a great idea.

*Julie:*

All right, well I like to try and wrap up our seminars right on time and we're nearing our 11:00 end time but I encourage anyone who couldn't finish asking a question to make connections with the presenters, to type them in online, or to let me or the Agrilinks team know. We'll probably provide some follow-up on further questions in a post-event email that all of you will receive.

And so I just wanted to let you know that there is no Microlinks, no longer Microlinks seminar in March and we're still trying to solidify our Agrilinks seminar for March, but there are many Links websites at USAID and there's one called Landlinks that you may or may not be aware of and they're having a follow-on to the Microlinks joint seminar from October that will discuss lessons from public/private partnerships for responsible land-based investment in Mozambique so there's a lot of interesting knowledge-sharing seminars stemming from USAID Knowledge Management websites, so checkout [landlinks.org](http://landlinks.org) if land tenure is in your wheelhouse.

And so lastly be sure of course to come check out the PICS bag if you're interested in seeing it in person and we'll see you hopefully at future Agrilinks and Microlinks events so thank you very much for attending.

*[Applause]*

*[End of Audio]*