



Fertilizer Deep Placement Technology A Useful Tool in Food Security Improvement

Q & A Transcript

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Presenters

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Zachary Baquet: Thank you. We're going to open it up for questions. As I said, please state your name and organization before asking the questions. We're also going to alternate between the in person and online audiences. With that I'll open it up for questions.

Male: I'm Adam Reinhart from USAID's Office of Food for Peace. We have three different projects in Bangladesh and they're using this technology in parts in some of the areas we're already working in. So this is particularly interesting and your presentation is very much appreciated. Thank you for sharing it with us. I have way more questions than I have time for so I will just ask one for now and then maybe we can discuss some more later. One of the most interesting finding that I saw there (I a neuroscientist by training) was the one percent increase in organic matter due to deep placement over ten years.

That's incredible to me – in fact almost unbelievably so. How much data do you have to back that up? None of your graphs really contained much indication of significance. One of them did but most of them did not. There were a couple R-squares involved but not enough for me to really figure out how much data this is based on. And that particular claim I think is one of the more interesting ones, with huge potential actually if that's true.

Upendra Singh: Thank you very much. That particular data we had collected samples from five UDP fields where urea deep placement technology and five from normal fields in the same village. But we have plans to go and take more samples because we were also surprised. Organic matter increase is not something that just happens that quickly. And we did also some correlations with CEC and other things to make sure that by chance these fields were not started high with organic matter.

We had not taken any samples ten years ago and that would be the way to do a research. But many times these are not research ideas as we go along. We do have plans to go back and relook at those data and get more samples. This is one area where the deep placement started back in the 1990's or so. There are farmers who – That tells you also the sustainability of the technology. There is no project in that area. It stopped in 1994 or something but farmers are continuing to use that technology on their own – making briquettes and applying.

Zachary: We have a question from online.

Female: Yes this question comes from Christopher Gorham from USAID/BFS. Can the speaker please elaborate on the gender dimensions that were mentioned earlier in the presentation?

John Allgood:

Yes the gender dimensions – The project has a 20 percent target for woman participation in all activities. What we've done – We originally came with a program where we would simply encourage women to attend our training programs, attend our demonstration activities. But in that environment in Bangladesh women won't necessarily go unless their husbands come or their husbands know their coming. So we have modified our program to make sure that the husband is invited along with the female household members. We've also adjust the timing of the programs so that we don't ask the women to come during heavy workload times at the household.

We've made some adjustments just to accommodate women but the gender dimension is definitely an important factor. And as I mentioned Paul Weisenfeld asked us to raise that to a new level. We're doing that in every activity from the training to involvement of women in the Department of Agricultural Extension and so forth.

Male:

Thanks. I'm Mark Seifert, Bureau for Food Security USAID Office of Markets, Partnerships, and Innovation. Thank you for your presentation. I too am curious about the gender component and I'm wondering if maybe moving this towards horticulture vegetable crops might have a beneficial impact on gender ratio. And if that's the case if you could talk a little bit about what you're thinking down the road in terms of how to incorporate a more diverse crop existence beyond rice.

John Allgood:

That's really a good question and that's something that we're wrestling with right now. A month ago there was a major workshop in Bangladesh to allow us to go beyond just urea deep placement to bring in nitrogen but also phosphorous and potassium, and NPK product. That has some policy dimensions but we're doing that. By bringing that product it is much more suited to diversified crops: things like cabbage, things like cauliflower, and brinjal, household gardens where women play a major role in the production system.

We see that as an opportunity to bring more women into the project. I think that probably is the major side. We're seeing increased yields of rice and because of that some area is being moved over to other crops. So it does support crop diversification. Bringing the NPK fertilizer, a balanced fertilizer approach, really brings a nice dimension that will give more opportunities for women.

Zachary:

We have a question from online.

Female:

Yes this question comes from Lenis Liverpool-Tassie from MSU in East Lansing Michigan. Have there been any empirical studies that have compared yield gains from UDP use verses conventional broadcasting on

farmer fields, not demonstration plots in Bangladesh or other countries and also against farmer practices which might not be the optimal practices, e.g., use of irrigation or transplanting, which I understand are critical for UDP use?

Upendra: Yes there have been. Even these demonstration plots that I talked about – Actually they were farmer demonstrations. And also there have been crop cut data obtained from both fields where broadcast urea application was done compared to urea deep placement. And in all those situations, again the yields were much higher with deep placement. And that's the reason, as we said, farmers are adopting the technology because they're not worried about N₂O emission. The key things there are focusing on increasing yields, the first thing. And then what makes it even better is the bonus they get by using less fertilizer. So yes there are from farmer field information and results that support both the research and demonstration findings.

Male: Hi this is Thomas Gibb for Bureau for Food Security. I have a question about the micro or small enterprises that are transforming fertilizer into the briquettes or the pellets. Can you clarify what the amount that those enterprises actually pay for the machines through the project and then also indicate what is the sustainability plan for new enterprises getting set up without that kind of startup funding or co-sharing of the expense?

John: Thank you for that. Yeah we know because of the high risk involved and entrepreneurs investing their own money that there had to be some incentive just beyond helping to build demand. So we do have a phased cost-share program. Right now the farmers are paying about \$500.00 for the machines. We're paying about \$1,500.00. The total cost is actually about \$2,300.00. So we're paying about 75 percent. The entrepreneurs are paying about 25 percent.

But we plan to scale that up. And we're doing that scale up right now in year three. It's a 50/50 balance. So the project is paying about \$1,100.00 and the entrepreneurs are paying about \$1,100.00. That's a difficult adjustment for the entrepreneurs to realize that six months ago they could've bought that machine at half the price. But the difference is the demand is going up. So there's better marketability. And we're also showing that the entrepreneurs that are successful are making money.

As I indicated on one of the graphs the payback period on a full cost machine, based on the volume of sale that we're seeing from the dealers, is only 18-24 months. So it's extremely attractive for a small entrepreneur. The one thing that we are hoping to do is to get the large factories to begin to make these particles. If we do that we know that would jeopardize the sustainability of the small entrepreneurs but we're working with those

entrepreneurs to bring in NPK fertilizer which will give them another product line that will sustain their business.

So it is a process. And the process is gradual phasing out of a cost-share, gradually giving more financial responsibility to those dealers to fully invest in the machines, and at the same time we're continuing to build demand so that they'll be able to sell their product in the market.

Male: We have a question from online.

Female: This question actually came in through Twitter and it's kind of related to the question that was just asked from Kirsten Weeks @klweeks who's in Rwanda right now. How can we raise awareness of better fertilizer practices with smallholders and vulnerable populations?

John: Well that's a pretty broad question. But I think the answer is the only way you can do it is by dedicating the resources to educate farmers. We're doing it through a project based approach but we're involving multiple stakeholders: with the village leaders, working with farmer groups, working with the integrated pest management groups, working with the Department of Agricultural Extensions. But it all comes from a plan to involve and create as much ownership as we can.

The education process that we're using is heavy on demonstrations of technology, heavy on farmer training. The season that we've just completed we will train 113,000 farmers in a classroom type environment. Those are one-day programs where we explain soil fertility management, balanced fertilization, and like Dr. Singh says, the difference in yield possibility with fertilizer deep placement. It is farmer education; it's technology demonstrations; and a strong promotional campaign. And having the Ministry of Agriculture and the Department of Agricultural Extension doing their own promotional activities really, really leverages what we're doing.

Male: Samba Kawa again from the Bureau for Food Security. Can we look at a graph for Sub-Sahara Africa again please? I wanted to know if those differences were significant statistically or they were -? What's your opinion on those? And the second question I had was I'm assuming with either urea the USG or the briquettes we're not going to be doing second application right? You only apply once?

Upendra: That's correct.

Male: Thank you.

Upendra: Sorry. In some of these examples – like for example Niger and Nigeria, the differences are significant. Perhaps an example of Togo – I don't have the statistics with me. These are some of the results that our colleagues in West Africa provided. Perhaps they are not statistically different. But overall the yields were always higher than the broadcast application. And in talking about yields, this is probably done in research combinations. But all the data that John presented, all the results like the boro 2012 yield that he showed; they are all coming from farmer's fields.

They are not research station yields. So that 600 kilogram yield increment that he talked about in boro 2012 season; those were farmer field results not demonstrations or research results. Some of this may not be significant but the in the majority of the cases there were significant differences. And we've just started this work in Africa. We're not emphasizing too much on there because we want to really get more numbers and get numbers from the farmer fields rather than the research station type results.

Male: Question from online.

Female: Yeah there are two fairly specific questions so I'm going to ask them both. The first one is from Ian Gregory who works at IFDC in Muscle Shoals, Alabama. From a marketing viewpoint the name for urea supergranules in Bangladesh is guti. This is widely used by farmers and dealers. Is there any significance in the name? And the second question comes from Osagi Amiomi in Bangladesh. Is the effectiveness of UDP affected by abiotic factors such as flooding and salinity?

John: The question about by Ian is a good one about guti urea. The term guti – G-U-T-I is a local term in Bangladesh. And when I first heard the term I asked why the term guti. There is no meaning for that word in Bangla to my understanding. If anyone speaks Bangla here you might – But it is a term just to give it that name recognition. The product is known as urea supergranule (USG) so we try to avoid that term. Fertilizer briquettes are large pellets, but guti urea is known only in Bangladesh.

But it is known throughout the country. So it's just a coined name that one of our staff that had done research with some of our researchers years ago came up and basically there is no meaning either adverse or positive. It's just simply a term that was applied to the product.

Upendra: I don't know how close Bangla is to Hindi but in Hindi guti also means marble so I can see some connection but I'm not sure about that either so that's just a – The other question dealing with a biotic affect; one of the things that we've realize with the deep placement you would also have problems – If a soil is saline, salinity is the major limiting factor. Deep

placement will not necessarily increase your yield. You will have to solve that problem. It's not, unfortunately, a magic or a silver bullet that will solve all problems.

But on the other hand it allows options, as John mentioned that NPK – The briquette becomes a delivery mechanism because with that if you want to include P and K so you get the NPK briquettes. If you want to include something that will help with the salinity or micronutrient problem it allows you to customize your application. And the customization is a key component that we would like to emphasize because the way it's produced right now it's village level. So if a certain village has a micronutrient problem we could go ahead and add zinc.

Say if zinc is limiting there we could add zinc to that urea and supply it that way. Or if there's an issue with the salinity perhaps deal with it either with the deep placement or have an amendment.

Female:

Clara Cohen from the Bureau for Food Security's Office of Agricultural Research and Policy. Thank you for the excellent presentations. I have a question about the adaptation you described to horticultural crops and wondered if you were also seeing the same reductions and loss as you were in the technologies adapted to patty systems?

Male:

Yes we are seeing similar reductions but the key component here – This is something – It's happening for two reasons in the upland fields. One, it's due to reduced volatilization again. Volatilization is cut down in both flooded fields as well as the upland crop fields. The other component is the leeching losses. With the higher concentration of ammonia around the briquette there is a reduced nitrification process that _____ also. Both combinations of reduced leeching and reduced volatilization are having impact on the upland crops.

The other thing is the placement also helps better root development. Instead of broadcasting on the surface, for upland crop the placement is somewhat different. Unlike rice you may end up putting not just a single briquette but multiple numbers of briquettes around the plant, particularly when you are looking at NPK because with a single briquette now you are providing three different nutrients so that the number of briquettes may increase.

So when you do that you put it around the plant and it helps improve the root growth and in some source p availabilities also increase because p fixation is reduced by having it in a localized placement.

Male: Hi my name is Matt Curtis. I'm with the Bureau of Food Security. I had a question about the deep placement and places where iron toxicity is an issue. Has that been looked at? What's the interaction?

Male: That's a good question and I don't think any particular study had been done on that in terms of whether deep placement would help nor would it be a negative impact on iron toxicity? Most of the time the iron toxicity issue comes in when the field is flooded for the first time. Or what really happens is when you flood a field if the iron levels are high, with the reduced conditions, the iron converts from the ferric iron which is less soluble to the ferrous and that ends up causing iron toxicity problems.

That issue would happen regardless of deep placement. And I think this is an area where we've really not looked at it. There are issues like iron toxicity. There are also cases of acid sulphate soils where people have done some research in the past where they've shown some advantages and then some results were contradictory so no advantage. I'm sure someone probably has done some work. You have to realize that this technology has been around for – I didn't want to bring it up but it has been around for more than 20 years. So there's a lot of research that has been done.

Researchers have done a lot but the bottle necks and some of the things that John talked about was what stopped it from being adopted by farmers.

Male: One last question.

Male: John Bowman with BFS. I'm wondering about the reaction of some of the other value chain players and stakeholders as these 900 some shops have gone up around Bangladesh, like for example those shop persons who are selling the prilled urea. How are they reacting? Are you getting other shops associated with agribusinesses that might be well-off type shops and \$2,000.00 is nothing to them. This looks like a great money maker. Can I get one of those machines? Are you getting that kind of reaction as well – demand from richer merchants to do this? And also the prilled urea sellers – how are they reacting?

Male: That is really a good question and it's something that we talked to the Bangladesh Fertilizer Association about because they represent the private sector in Bangladesh. They are moving through that system about 2.5 to 3 million tons of urea. So the volume is huge. There are about 7,000 members in that association. You can do the math to see the volume of their sales. We're talking about a market right now that's about 100,000 tons a year. So order of magnitude we're less than eight – We're right at five percent of the market or even less.

Even though there is good profitability in what we're doing those companies that have large volumes don't want to go through the trouble and that's a big part of the process – the trouble to hire labor, to deal in those small quantities. It's not attractive for the big guys. The big guys have asked us to go to the government to get one of the factories converted to make the product on a commercial basis. Then they will buy it from the factories and they'll gladly put it in the marketing chain.

But for these small entrepreneurs it is a great money maker. You know it's very profitable for the small guy that is only selling maybe 100-150 tons. We don't have any dealer to my knowledge right now that's selling more than 200 tons in a year. But even at that level that generates a lot of profit for that small entrepreneur. It's great for women entrepreneurs. It's great for women/husband entrepreneurs. But for the big players it's not attractive because of some of the extra work involved, some of the small volumes and that kind of thing.

Male:

With that I'd like to thank your speakers, Upendra and John for joining us today. [Applause] I'd like you to take a moment and fill out the evaluations that were on your chair. Or for those of you who joined us online we've got a link for you. We take these evaluations seriously to improve upon Ag Sector Council so we appreciate it. The recording for this session will go up on Agrilinks so look for it on the event site. For those of you who RSVP'd you'll get an e-mail notification of that.

And please join us next time for Ag Sector Council in May. Thank you very much. Have a good day.

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