This is David Lamm here at the East National Technology Support Center. And joining me in the room today is Russell Hedrick. He's the farmer. And I'm going to let Russell introduce himself and the other guest I have in the room here with me before we let Madalene begin her presentation. So Russell, you want to say a couple words?

Thanks, David. My name's Russell Hedrick. I'm a young farmer here in North Carolina, located in Catawba County, city of Hickory and Newton. And we're going to be discussing the cover crop case study that was done on our farm. And I'd like to introduce my district conservationist with the NRCS, Lee Holcomb.

Thanks, Russell. My name, again, is Lee Holcomb. I'm with the Natural Resources Conservation Service. I've been a district conservationist in Catawba County for only two years, a little over two years. And so I cover Catawba and Alexander Counties, and that is in the foothills of Western North Carolina.

OK. Thank you, gentlemen. And then we'll turn it over to Madalene Ransom, who let me introduce her as the East National Technology Support Center's economist. And she's going to be talking about a topic as I go around and work with folks and discuss soil health. Everybody's interested in the economics of it. And I really appreciate her title that they've chosen, Cover Crops-- Why Grow a Crop You Don't Sell? I think that's a very interesting and intriguing topic. So Madalene, we're going to just turn it over to you.

And before I do, I just want to let folks know that we will be pausing at a couple places during Madalene's presentation to respond to the questions that come in. So again, if you have a question, go up there to the notes section, type it in, and I'll be reading them to Madalene at the appropriate point of the presentation. So Madalene, the floor is yours.

Thank you, David. And thank all of you for joining us. I am so pleased that Russell and Lee can be here with us. We want to thank Russell and Lee for this webinar. Russell is a meticulous farmer who takes lots of notes and has been generous to share them with us. Russell and Lee have never tired of our questions and they've given us an abundance of detail. In fact, we have so much detail it would take hours to share it with you, so today we're sharing part of it.

This webinar has three parts. The first part is going to describe Russell's farm and the on-farm test he

conducted. The second part presents the benefits and costs due to cover crop on soybeans in the first year. And the third part introduces partial budgets. And they are really important to understand in order to avoid miscommunications with farmers.

If at the end of this webinar you want to have a follow-up webinar on another aspect of this case study, we can do that. We've done it in the past, and we'll be glad to do that again. Our focus is the farmers who are thinking about trying cover crops. Our goal is to provide them enough detail so that they have a specific framework they can use to imagine their own transition to cover crops.

Well, let's talk about Russell's farm. It's the Rocky Ford Farm. And I hope you can see my cursor here. It's in North Carolina in the western section in Catawba County. The Farm Service Agency has defined seven fields on this farm. Four are cropland and those are the four I've identified in this map. And the rest is forestland and then headquarters.

A little bit of history about these fields, the cropland fields. Fields 1, 2, and 3 have been in cropland for quite a long time. And for the last 12 or so years they've been in continuous no-till corn. Previous to that, they were idle and the weeds were bush hogged once a year. The more northernly field, Field 5 here, which Russell broke into two sections for soil testing purposes, this had been forestland for a long time. And in 2012, Russell converted it to cropland.

One of the things that's really important is the initial conditions of any study. And this is the study of transition, going from no cover crops to cover crops. So what were the initial conditions? And for this, it would be the initial soil conditions. What kind of soil did Russell start with? Was it good, excellent, or degraded? And this is the kind of information that will help a farmer and a conservation planner better assess how useful or how transferable Russell's experience are to their own circumstances when they are deciding whether or not to try cover crops.

Well, we use two types of information. One was the soil survey. The NRCS Soil Survey. And here's a map of the soil types. Again, this is Russell's farm, a stream running along the edge of the farm, and the green is a Congaree soil with slopes of 0% to 2%. It's categorized as prime farmland when it's not flooded, and because it drains well it's not often flooded. The rest of the cropland up here is leveled clay land, a Lloyd loam, and it's more slopey at 15% to 25%, and it's not classified as prime farmland.

Russell has done a lot of soil tests, and our agronomist, Steve Boetger, looked at them and chose the

one that would be most appropriate to compare with the county's soil survey. So Steve looked at three. The first one was the percent organic matter. And so Fields 1, 2, and 3-- the ones that have been cropped for quite a while-- had soil samples in October 2012. That was just before planting the cover crop. And you can see that Russell's soil had far more organic matter than the county average.

And in October 2012, he did not sample Field 5 because it had just come out of the forest land use. The second one that Steve looked at was the Cation Exchange Capacity. And you can see that these are within the county range. No big outliers here. And for me as an economist, that's an important piece of information because it foretells-- a higher CEC foretells a lower cost in that the farmer less frequently has to apply lime.

And the last one that Steve considered was soil pH. And we can see, again, Russell's samples were quite close to the county average. A bit higher, a bit more neutral because Russell had applied lime the year before.

So what do we say? We say the initial soil conditions for Russell is that he didn't have degraded soils. The land use history anticipated that, didn't it? The lower fields have a potential actually for a sharp increase in biological activity after only one year of cover crops because of the high organic percentages.

So let's go on to Russell's on-farm test. What was he testing? When Russell first heard about cover crops, he was interested in the weed control and soil erosion, reduction of soil erosion. So that's what he decided he was going to test.

Well, why would he perform his own test? There's literature out there of what's going on and what you can expect. And as he said to me, you know, the research is all well and good. I just wanted to see what cover crops would do on my farm. So how did he perform this test?

So we bring back the map of the crop acres, and what he did was block off middle section as no cover crop. Marked it with yellow flags. And then he drilled a cover crop mix for corn in this upper field, field 5, and a mix he designed with Lee. And then he drilled cover crop mix for soybeans. Again, a mix designed with Lee. And after the cover crops were terminated, he planted the cash crops. He no-tilled corn and then he drilled soybeans.

And remember, the hatched area is the no-cover crop area. So what is this map telling us? The corn

was planted on cover crop and no cover crop. And the soybeans planted on cover crop and no cover crop. And they were planted-- the corn was planted same day, same seeding rate. The only difference was the existence of cover crop or not. And remember, this soil map shows that this whole area here-- my cursor is-- this whole area here is the same soil type so the soil type was constant.

So during the cash crop growing season, Russell being the attentive farmer was going out to see how is this going. What's happening out there? What does this cover crop stuff look like? Well, I was out there in mid July with him and we were looking in this soybean field that had cover crops and here's the cover crop residue-- looking for weeds. Saw almost no weeds. This is important in the Southeast because increasingly weeds have become herbicide resistant.

What Russell had decided to do in his test was not to spray opposed to herbicide just to give the cover crops a real test, what could they really do to control the weeds. And what was interesting about this past summer, the summer of 2013 was extremely wet. More than twice the normal. And it was so wet and so often that his neighbor farmers weren't able to get out there to spray their herbicides in a timely manner, but Russell didn't have to worry about that.

The other thing that Russell saw in his test was the erosion on the no cover crop area that he did not see in the cover cropped area. The other thing during the growing season was a surprise. He did not expect in the first year of cover crop to observe a difference in the plants. And these are soybean plants. And the one on the left, the larger one, came off of the cover cropped area. The smaller from the no cover cropped area.

And I was there that day and we were just walking across the field and talking and just plucked the plant from cover crop and just plucked-- so we did not look for the largest cover crop and the smallest no cover crop. And so when we look more closely, the one from the cover crop had more pods. There were more beans in a pod. And at that time in midsummer it looked like those beans might actually be larger at harvest time.

So harvest time. Last year, Russell's harvest were two kinds of harvests. One was harvesting to the test and after that was done, then he harvested for the rest of the fields. So let's look at soybeans no cover crop.

So we'll expand that a little bit. Blow it up. What he did was go out to the no cover crop soybean area,

easy to identify, and he harvested the largest rectangle he could in that area. He measured it with a measuring wheel and then took the truck to the elevator. The elevator then measured the number of bushels in the truck and now he had truckload bushels divided by the measured area, and then he could calculate his yield.

He did this three more times. So he did it with the soybeans with cover and the corn with no cover and the corn with cover. So let's look at the results for soybeans.

So the soybeans with no cover crop. The length and the width, acres. The truck load 101.18 bushels. Do a little bit of arithmetic and you get 50.5 bushels to the acre. Same with the soybeans on the cover crop in this section here. The length and the width, the truckload, a little bit of arithmetic, and it's 68.6 bushels per acre. Bringing them together, we can now calculate the increased yield of actually 18.1 bushels per acre rounded to 18 bushels. So that's how Russell calculated the change in yield from his test.

Well, was this a good test? Not to the researchers. He didn't have plot replications and he was only doing it for one year. But the question still remains, was this a good test? Well, for the farmer it was. He saw few weeds in the cover cropped area. He saw erosion in the no cover cropped area. And he saw evidence of a yield increase. In fact, he experienced that.

And when I was out there with him this summer and we talked about this, the thing that struck me about his test was that the no cover crop area reminded him of what that whole farm could have looked like. Sometimes when you make a change you forget where you came from. And that test enabled him to remember where he came from. So David, I turn it over. Maybe there's a question.

Yeah, there is. Thanks, Madalene. And a couple questions and I'm going to direct these towards Russell here. What particular weed issues were you trying to address by going to this cover crop mix?

The previous year, we really had to battle hard with redroot pigweed, cocklebur, and morning glories. We had pretty heavy pressure.

OK. And then I've got two more Madalene then I'm going to let you keeping going. The second one, maybe I'll direct this one towards Lee. You developed the cover crop mix. Could you tell us what was in it and what was your rationale behind choosing those particular species?

Well at first, Russell, since he was on the floodplain and he had some concerns as far as when flooding would get involved-- it would wash away some of the soil through that way. So we implemented a lot of small grains, such as cereal rye, oats, and triticale. And then of course to avoid maybe some of the immobilization of nitrogen, we added legume, crimson clover, and then we also added-- if you can get it planted early enough-- daikon radish.

OK. And then one more question. Speculate why the yield increased. That's a statistically significant yield increase. Why do you suppose that came about, Russell?

If I had to contribute to the yield increase, 2013 was an extremely wet year here in North Carolina and a lot of guys saw a lot of weed pressure because they couldn't get in the field and spray due to how wet the soils were. I think the cover crop keeping the weeds back kept the plant health and helped that plant excel as far as producing bushels.

One more quick question came in. I'll direct this to Lee maybe. Did you see-- your cover crop, did you see, did it come up uniformly as far as the variety of the mix of the species or did you see patches or just give a general description of that.

Yeah, because Russell actually did no-till, drills all the species in, we were very surprised and very happy that the crimson clover and the daikon radish came up really well, even when established with those three small grains.

OK. Good. OK, Madalene. We're caught up for now. And again, I remind folks if you've got some more questions go ahead and type them in, and at the next pause we'll try and work those in. So back to you, Madalene.

Hey, thanks. So let's look at the benefits and costs due to cover crop on soybeans in the first year. The benefits-- this is the happy news-- and before we get to that, I want to issue a caution. So in order to make the presentation just cleaner, I used rounding. And if you're going to do your own arithmetic you may be off by $1 or so. So just know that.

OK, so the first is the benefits based on yield. And so we already know for soybeans that Russell calculated an increase of 18 bushels an acre. His contract price is $12.75 a bushel and his increased gross revenue is $230 an acre. Well, there's another category of benefits and those are based on production inputs.

Russell would have given a little shot of nitrogen to his soybeans at the beginning. And because of the legume in the cover crop mix he did not have to spend that $23 an acre. The other was post herbicide. And so as we've said several times already, he did not spray. That saved him $28 an acre.

And so the total savings for the crop production costs $51. Adding that to the gross revenue increase, the total additional benefit in dollars per acre was $280. Well, let's go to the bad news. The cost in the first year. Very important to keep that in mind.

We had nine cost categories. And Russell and I designed these through the interview process. Like, OK, so Russell, what did it take do this? And so the very first chronologically is learning. Russell is in a community that doesn't use cover crops. And in fact, the title of this webinar, Why Grow Something you Don't Sell, came from a farmer I heard ask that question of Russell. Why would you do that?

So Russell had learning, essentially on his own, with technical assistance from Lee. Of all those, we're going to talk about the learning cost, break it down, how could it possibly be $67 an acre, and then we're going to look at the cover crop seed cost, the field monitoring, termination, and a short note about the additional cost to plant his cash crop because he had cover crop. We see that in the first year the total additional cost was $152 an acre.

So now, we're going to look at the learning costs. The farm field day-- it all started there-- six hours of Russell's time. This is when he first heard about cover crops and he was really curious about, OK, so weed control and erosion. Hmm. That's interesting. And then he started working with Lee. In the field office, Lee went out to the field to walk with him.

Russell also received assistance from one of our agronomists from the East National Technology Support Center. And Russell also spent time talking with ARS-- Ag Research Service-- the Rick Haney Soil Lab. And that was seven hours.

Look at this one. Internet, nine hours a week for 12 weeks. That was 108 hours. How does that make sense? Now what is the 12 weeks? That's the time between his learning that there's such a thing as cover crops to the time he made the decision, he paid for the seed. So in those 12 weeks, he was spending about nine hours a week-- remember, he's a meticulous farmer. He takes notes.

And I thought about that. Is that reasonable? And then I thought about-- he started from zero. Did not

know what cover crops were. Did not know what soil health was. Gosh, that's kind of like when I took physics. I started from zero. And a three-unit course. The recommendation is for every unit of class time you're supposed to spend three hours of study time. So for a three-unit course, spend nine hours a week studying.

Well, you know, Russell essentially took a course designed by the DC and the agronomist and the soil folks and ARS, and it made sense to me. That's actually feasible. If you're going from zero to making the dollar commitment to buy that seed, that's probably a reasonable amount of time. So his total time was 121 hours. The value of the farmer time, what were we going to say was the hourly value?

And as I got to know Russell knew that he does everything on his farm. He is doing the marketing. He is doing the planning. He's doing his crop advising himself. Identifying, designing equipment modifications. He's doing the maintenance and repair on the equipment, and he's doing the field work. He's doing all of that.

So how would you value that time? And so we decided $20 an hour for anything he did would be a good average. And there's Economic Research Service, a publication that we also use to see if this was ballpark. And this is ballpark. So the value of time for learning was $2,420. And then he takes notes, and so he said, oh, you want to add the postage for sending the soil samples to Haney. And that was in the learning category. So we take those total learning costs and divide it by the 36.35 cover crop acres. We have $67 an acre for learning.

The cover crop seeds. So Lee has already talked about the mix. And then here's the seeding rate. Here's what they paid. The thing that was interesting was the mixing, bagging, and shipping cost of $11.25 an acre. That is 25% of the total cost. And when Russell saw that he thought, next year we've got to find somebody who doesn't charge so much for mixing, bagging, and shipping. And it also brings up the question of when we give farmers an estimate of seed costs, do we really think about that function?

Let's go to the field monitoring costs in the first year. Can you imagine how field monitoring could possibly cost $11 an acre? Well, he drilled his cover crop and in October he went to visit those fields twice a week. And each trip took about an hour. And then for the rest of the cover crop season, he went out once a week. And by now, he knew what he was looking for so those trips were only about 15 minutes a trip.

And so he had 13.5 farmer hours out there, monitoring at $20 an hour. Boom. We've got that cost. Every time he took a trip he'd burn fuel and a gallon a trip, $4 a gallon, there we have fuel costs. So when we take those two costs, add them up and divide them by the number of cover crop acres, we have $10.73 an acre.

Termination costs for soybeans. My question to you is, what's not in the following costs that you think should be there? So the termination costs that we counted, there's farmer time to roll the cover crop, 15 minutes an hour at $20 an hour. The fuel cost, 0.6 gallons per acre, $4 a gallon. And then there was the farmer time to go out and check the termination, and then fuel cost to do that check. And so the total termination on a per-acre basis was $8.06 an acre.

So what's missing? There's no herbicide cost here. Why is that? And it's because Russell would have terminated his winter weeds with the same herbicide. So for Russell, the herbicide cost is a cost he would have incurred in any event. So it is not a cost due to cover crop.

Additional costs to drill the soybeans. Just a little note here. So when he went to plant his cash crop, it took him a little bit longer to go across the field. And in fact, he said it took him about two hours longer for the 36.35 cover crop acres. And at $20 an hour that's $40 spread over 36.35 cover crop acres, and that was $1.10 an acre.

And notice the detail here. It's such a gift to us to have a sense of what it took for him in his first year. So David, maybe now's a good time to see if there's a question or two?

Yeah, there are, Madalene. And again, I'll bounce these back and forth over here because they're asking more about the management activities. One of them-- Russell, I'll direct this to you-- is what kind of weed pressure did you see a difference between the corn and the beans and then between where you had your cover crop and then no cover crop?

We saw quite a bit of difference in the weed pressure. When Madalene came out to the field and we took some pictures-- she might be able to make those available at a later date-- but we still had a lot of morning glories, a lot of cocklebur in our no cover crop area. And where we had the cover crops that mat just seemed to suppress it. It just couldn't break through it and get a hold on the crop.

OK. Question about how did you decide how deep, or planting of the cover crop mix, since you had five

or six species. You want to take that one, Russell?

Yeah, I'll take that one. When me and Lee designed that cover crop mix, we were able to use the NRCS database as far as maybe the seeding depth and took a happy medium. Some of it might have been rated for 1/4 inch and some of it for an inch, and you just have to find that area where you feel comfortable maybe going 1/2 inch or 3/4 inches to make sure you're getting everything in that level area.

OK. This one's directed at you, Madalene. Why would we consider-- maybe you can clarify a little bit this whole idea of educating the farmer and why it's important to consider that when you're looking at cost.

I think it's really important-- see now, Russell is in a community where there were no farmers doing cover crop. So he didn't have a farmer mentor to help him with shortcuts. So he was really on his own with the technical folks.

And I think that's important to help farmers not be surprised that-- the advantage to Russell of all that learning, and I did ask him, did you feel like you spent too much time learning? But he had such a solid base of information that when the summer turned out to be very, very wet or any other event that happened, he had such a broad base of information that he could really interpret what was going on and stay calm. And one of the things he said to me was, if it wasn't for all that learning I did, when I saw that four feet of thick biomass I would've panicked. And so it is a really important part of a transition is to learn, especially in a community where you don't have that knowledge.

So learning led to confidence and understanding that was going to come down the road. So that's a good point. And one more question. I'll direct this one at Lee. Changes for cover crop plans for 2012 in the mix, did you guys discuss that, and you got anything that you're going to do to improve on what you did last year?

Well, I think Russell has done a lot more homework, talking to different vendors as far as availability to cut down that big price that we discussed briefly with the mixing cost. But really I think we're going to, more or less, we're going to alter the rate more so versus totally changing up the mix.

OK, so keep the same species composition, but vary the rates accordingly. OK. All right, Madalene, why don't we go ahead and turn it back over to you and continue on?

Great, thank you. So before we leave costs, let's look at Russell's expected costs of the second year. And so what we've done here is restated the cost categories, and in the faded font is the first year costs. Remember, it was $152. But in the second year he's expecting about $69 an acre, which is less than half. So where were the changes?

Well, learning went from $67 to $0. Does that mean Russell stopped learning? No. What it means is that his learning is going to be in smaller segments, a conversation here or there, a phone call or a text message or an email. It's not going to be that protracted sitting down and really studying. So he is expecting not to spend a whole lot of time learning.

What else? The cover crop seed costs are going to go down because he found a vendor who sold high-quality seed at a lower price. The other decrease is in the field monitoring. So in his second year, he learned a lot in the first year, and so he doesn't have to spend that much time monitoring. So we see that the costs in the second year he's expecting it to be less than half what it was in the first year.

Let's bring it all together and look at the net benefits. Those are defined to be the total benefits minus the total costs. And so we saw that the total benefits, soybeans in the first year, $280 an acre. The total costs in the first year, $152 an acre. And the net benefits due to cover crops was $128 an acre. So for Russell, cover crops on soybeans more than paid for themselves in the first year.

Let's go on to a partial budget. Partial means part. It's a part of something. A partial budget considers a rather small change in the farm operation. And for us, today, the benefits and costs of cover crops comprise a partial budget for Russell. In contrast, an enterprise budget considers a major part of the farm operation, such as a whole crop budget. And for us, today, that would be to combine the partial budget of cover crops with the soybean budget without cover crops.

In fact, what we are doing in this section is combining Russell's cover crop first year benefits and cost with a generalized soybean crop budget, which considers only the variable costs of growing no-till, no cover crop, dryland soybeans. The importance of this section is to appreciate that what people call benefits and costs can mean different things in different budgets. And not understanding this can lead to communication problems with farmers who doubt the value of cover crops.

So let's look at Russell's benefits and costs-- the variable costs-- without a cover crop. And what we did was go look for a published no-till soybean dryland crop budgets and out of that, Russell said he didn't

want us to know his proprietary production practices, so the $275 was the variable cost per acre of the no-till dryland soybeans. And the way we are presenting this is in terms of the changes due to cover crops.

So the nitrogen bump was the $23. The post herbicide after emergence was $27. And the rest was $225. So that's what you might find on the web for a soybean budget. The benefits-- now Russell, remember, he was getting 50.5 bushels per acre at his contract price of $12.75 so that his revenue without cover crop was $644. And subtracting the $275 from the $644, we have $369 an acre that he made without cover crops.

So now let's add his cover crop benefits and costs. And what this is doing is inserting the cover crop costs into the costs and inserting the benefits due to cover crops into the benefits, and then being able to calculate the net benefits once the cover crops are in there. So the cover crop costs and benefits we've been talking about is a partial budget. It's not why he put them in there, not for them themselves. It was for the benefits he was going to get out of them.

And so we tuck those costs into the no cover crop budget to get an enterprise budget that we might name-- if we were publishing this-- we'd call this enterprise budget no-till soybeans, dryland with cover crop. And of course it would be first year because of the costs. And so what did cover crops do?

Well, we come down to the net benefit section here, and we saw that without cover crops he was getting to keep $369 an acre to pay for his fixed costs and maybe have fun. And then the cover crops added $128 to that for the cover cropped acres so that he had a total net benefit that was larger by $128 an acre. Understanding a partial budget prevents the following communication problem. This is the wrong way to say it.

So a planner says to a farmer, you can make $130 an acre with cover crops. And the farmer thinks about that and says, but I already make $370 an acre without the fuss and bother of cover crops. Fuss and bother, by the way, should have been put in quotes. I heard that. But the right way to say that is the planner can say, you can add $130 per acre to your existing profits with cover crops. And that lets the farmer think, really?

And so Russell answered the question, why grow something you don't sell? Reduce soil erosion, reduce post herbicides, increase yields, and increased profits. So if you feel like you have questions after you

hang up from today, you're welcome to call me. My contact information is in that PowerPoint. And David, final session for questions?

OK. Thanks, Madalene. That's a most excellent presentation. I compliment you on that. And I do have a couple of questions. And again, I'll just try and direct them to who I think might give us the most appropriate answer. And I remind folks, keep the questions coming.

This one I'll direct at you, Russell. The idea of using gramoxone. Can you maybe explain-- there's a question about your sequencing of rolling, spraying, and then maybe use of gramoxone rather than-- would you use that on a cover crop or non cover crop situation.

Well, our termination is we get a high clearance sprayer to come out and spray. We usually wait about two or three days to let that chemical soak in and then we'll go out and we'll roll that mat down. The reason we use gramoxone is we try to change up herbicide chemistry. And we try not to using anything that we would potentially use post in a burn down application. And that way we can keep our pest management as far as resistant weeds down.

And we're rolling it with a coulter packer. We don't have a crimper at this time, but if you can dig one out of the woods it does just as good of a job.

OK. And maybe I'll get opinions from each of you related to this question. Would you have considered this last year experience as a best-case scenario related to the way things worked out? Or any comments from each of your perspective. Maybe I'll let you start, Lee.

I will say the biggest benefits Russell started out you wanted reduced erosion, reduced weeds, and we had a tremendous-- this is after he planted his cash crop-- had a tremendous flooding event July 27 this year in Catawba County. And with that, he already had that cover on the ground and we had so much small grain involved that it really prevented a lot of excess washing of the soil we already had intact.

And even with the addition of some soil material from the flooding event we still were able to limit the weed pressure, and so we accomplished both tasks that Russell set out. And so from a planner's standpoint, you always hope when someone tries something new that it works of what Russell was looking for, and it met his two factors.

OK, good, good. What about you, Russell?

Actually, I think the best is yet to come. I think getting our biological soil health built is something we're going to strive for. And every year we keep doing these cover crops and me and Lee went out there before we terminated and you could see the earthworm castings just straight on top of the ground. The soil tilth is getting better with every cover crop that we do.

And I think eventually you're going to reach that plateau that every year you're not going to see these great benefits. They're going to vary from year to year, depending on the weather and the mix that you plant. But I would just like to encourage everybody to try something new and try to spread the word.

And what about from your perspective, Madalene? Go ahead.

Yeah, thank you. I would like to let folks know that Russell is really a meticulous farmer. And in fact, his no cover crop yield is greater than county average by a lot. So he just gets a lot out of his practices. And other thing I want to share, something that Russell just said that he shared with me more specifically and that is if cover crops are going to pay 6 out of 10 years, he's happy. And what's important about that to me is that he's recognizing risk that you can't know from year to year what you're going to face. And so when he's looking at that big bump in profits, those profits are going to help him in the lean years.

OK. Thanks, Madalene. I'm curious, a question came in about the impact of the out-of-bank flow on the cover crop. Was that an issue as far as to knock it down, did you have trouble terminating it, planting into it, those types of things?

Yeah, actually, that's a good question. We had some that was still standing we were going to plant into and we had quite a big flood event and it just tangled that stuff all together and I was actually really worried about it. I met some guys from the NRCS at a field day and was talking to them and they had had the same experience. The thing to remember is once you put that cover crop down and it's down for a week to two, it really tends to dry up and we didn't have any issues at all with planting through it or good seed-to-soil contact. Cover crop is like anything else, if you want to be profitable with it and get something from it, you have to manage it.

So you didn't have an issue with it matting down and creating an excessively wet soil condition?

No, no, we didn't have any issues like that at all.

OK. Madalene, I have several questions related to, did you perform a similar analysis on the corn side of things? We focused a lot on the soybean.

Yes, we did. And the corn story-- we decided not to share the corn story because that one's more complicated and maybe that would be a really good follow-up webinar. The corn actually lost. And it lost about $5 an acre and so the corn plus the soybeans together, when you average them, we use an acreage weighted average, that Russell was still much better off with a cover crop. But the corn story was really interesting. Part of the problem was a mistake that Russell made and--

They cost the farmer.

No. And so that would be a really good story to tell, but I felt like for this first one that we really get the method down because the method of looking at costs and benefits is the same method. We just came up with different [INAUDIBLE].

Do you want to comment, follow on that, Russell what the curiosity was that killed the cat so to speak?

Well, in different parts of the country, people try different species and I wanted to try annual ryegrass. I'm not saying I'm completely against annual ryegrass, but here in North Carolina and especially in my operation we try to get the most biomass that we can from our cover crops, and we just let ours go way too long and had too many tillers and we had a difficult time with burn down and termination.

We might try it again in a later year. I'm not 100% sure on that, but, like I said, everything takes management. And my DC told me a little bit about it. And I went against what he said and we tried it out. But I won't fault him on that for not stopping me.

OK. Madalene, I'll kick this one to you. There's a question about-- you showed a slide about the anticipated costs for the second year and the benefits. Could you maybe go into a little more discussion about the differences and why there's a bigger cost ratio. Maybe you can go back to that slide. Just maybe review that a little bit.

OK. So the question is, why it's still $69 an acre?

Yeah, yeah.

OK. Because you read cover crop is $35 or $40 an acre, but it doesn't talk about the soil tests, it doesn't

talk about, perhaps, the cost of drilling, the cost of going out and seeing that things are OK. Do you have to replant some sections? And then maybe not even the termination costs.

So it may be $69 an acre--

OK. OK.

-when you think of everything.

So what you're suggesting is sometimes we tend to include things, such as the soil test or something that we just have become accustomed to using and don't account for it as a cost.

Well, it depends. And David, that's a good point. It depends. If you're doing the soil test because you always would be doing them without cover crop, then the soil test would be $0.

And you're testing every year, Russell, because--

Talking with Lee, it does vary even across our own state. We're in a very forgiving clay soil and our pH really doesn't change too much. Most guys might soil sample once every four years, but we're wanting to maximize everything on the farm so we do them every year if we can, especially on new ground until we get it built where we want it. And

We're trying to reduce our inputs. And with doing these cover crops, the more organic matter you build, the more organic nitrogen you'll get released later on in the year. And therefore, you have to soil sample it to get those results to see what's happening with your ground.

Do you have a comment, Madalene?

Yes, mhm. So even if it is $69 an acre, that's not the important number. The important number is the dollars you get to keep in your pocket. It's the benefits that came. So if you get $200 additional because of the cover crop and you only paid $69 to get that $200, it's a bargain.

That's a good return on investment.

Yeah, OK. All right, good. I've got a couple questions related to the management aspect. One, do you fertilize both your non cover crop and your cover crop ground the same? And then maybe you can follow it up, your planting-- what kind of a planter, openers, those types of things that you've got to

place the seeds in the ground.

We'll start at cover crop planting. And when we drill our cover crop, it is a 100% scavenge crop. We don't put any kind of fertilizer in the fall. It's just using what's residually there in the ground that our cash crop didn't use.

As far as the fertilization on the cover crop and non cover crop ground, the spreader truck went through it the same. We didn't change anything on rate. We tried to leave everything the same as best we could to see if there was a true difference between the cover crop and not.

And the planter that we use is we just used a standard John Deere 7000. We have added some extra stuff to it to deal with the residue, such as no-till coulters and floating row cleaners. And just very minimal stuff. Just make sure that your double disk openers and your coulters are sharp. And we haven't had any issues with penetrating that mat and getting good seed-to-soil contact.

And you used that on both corn and beans?

We will with beans this year. Last year, no. We used a drill for all our soybeans and it's just because we weren't set up where we wanted to be. But we planted corn and drilled the beans.

OK. Maybe, Lee, I don't know if you were out there. Did you notice any potential allelopathic effects since you had such a lot of rye, cereals? Was that an issue? Did either one of you notice it?

No. As far as that, when we looked at the weed pressure after we planted, we were happy to see-- and you always read about cereal rye, like you just mentioned, having allelopathic effects and keeping your weed pressure down. And we all can base what we saw in the field, but we were very happy with both the beans and the corn.

You didn't see any impact on germination or stand or anything?

No. We did several stand measurements, and we couldn't tell any stand reduction in our cover crop acres or non.

OK. Madalene, I've got a question directed to you maybe is this idea of fixed cost. I don't recall seeing anything mentioned in there about fixed cost. Can you explain what that is or maybe a little discussion on that?

Sure. So a fixed cost is a cost that does not change for some scale of operations. So for Russell, it would be the cost that doesn't change with the number of acres and cover crop or not cover cropped. So like his equipment costs, that would be a fixed cost. The taxes would be a fixed cost. Those don't change. So that's what a fixed cost is. And that's why it was very important to talk about a partial budget so we're not looking at all the costs on that farm. We were looking at the variable costs of growing the soybeans.

OK.

That's why the word cost it means different things depending on what kind of budget you're talking about. So that for him the net benefits that are in this PowerPoint are going to go to do two things. They're going to make payments on those fixed costs, and then whatever is left over from that he really, truly gets to keep.

That's what he-- OK. We've got just a few minutes left here. And I guess what I would like to hear is is we gave each of you speakers a chance to say what do you do next? Follow up? What do you anticipate results? What do you like to see? I'm assuming you're going to continue on with this project the next year or two so maybe, Lee, from a conservationist perspective maybe what do you see happening over the next couple years?

So like I said earlier, we're just playing with rates as far as with the five-way mix. Russell's going to continue to do what he has been doing. He increased his cover crop acres this year, except for-- last year.

And he's going to try some new mixes based on-- a common thing we hear about is, what if I'm harvesting my grain late? What are my options there? So he's trying to really come up with three different kind of mixes. One, if you get an early harvest of your grain you can plant this. Maybe mid-to-late harvest, and then a very late harvest, trying to adjust those mixes to be more realistic and try to be more cost effective.

And really we're trying to promote this more-- what I see from a conservation planner standpoint is we're trying to promote this more. Russell is going to hold a soil health field day on May 9 at his Rocky Ford Farm here in North Carolina. So with that, not only just Russell seeing the benefits, but letting him maybe be the mentor and being the guinea pig that starts this movement in hopes that we increase

participation in here.

Just because with the soybean harvest, a lot of times now even with no-till, have very low residue. And so we can do this cover crop mixes, we're scavenging some of the excess nutrients from the cash crop and obviously, reducing the chances for erosion.

There you go. Russell, what's your plans?

Like Lee said, we're trying some new mixes. We were actually able to find a vendor and they were actually able to help us with the seed for the next several years. We've had really good conversations with them and they're very knowledgeable. We're just trying to do things on our farm. I'm working closely with Lee. We're still doing several check acres.

If you've got some farmers, if you're an NRCS person or work with local farmers, there's always going to be that doubt. Tell them to do like we did. Leave some shakes. We've got three farms that we're leaving shakes with no cover crops on maybe an acre or two. And that way if area farmers want to come look at it, they can see the visual results that you did in the presentation today.

And we're also trying some new things. We're trying to plant cover crops before our cash crop this year. We're actually going to plant some buckwheat before the cash crop.

We'll give it about 30 to 40 days of growth and we will terminate that and plant into it and I think that's going to increase our water infiltration in the soil with that rip zone. And that's also going to build our organic matter and release those nutrients later on to cash crops. So you're always learning and it's something that you should always continue with.

That does sound interesting there. And Madalene, from an economist point of view, what do you see happening down the road on this type of a project?

Well, you know what I would really love is to find a farmer who's starting out with really degraded soil-- tobacco and cotton for generations-- and see what the cost of transition are for that. My guess is you're not going to get a yield bump for awhile, but I think that would be really helpful.

Well, I'm not going to poke fun. I'm sure there's a few out there and we can maybe try to find you one. That's a good one, Madalene. Well, listen, this has really been fun for me, a good discussion. And I'm going to let Russell finish off. This field day? You want to give a little more specifics if folks want to

participate and where they might get information on it?

Yeah. The website to register for the field day is www.eventbrite.com. And when you go there, you can just type into the search, soil health or Catawba County soil and water. It will bring up the event and you can register. What the day is going to include is we'll have Ray Archuleta out. We're going to get him to get the crowd pumped up and get everybody on what we're going to do that day.

And then Madalene is going to speak on the economics of this case study. Dana and, I think, Lee we're going to have a root pit, do some slake tests. We might do some infiltration tests. Steve will hopefully be there with a rainfall simulator. And if you've never seen a rainfall simulator, I urge everybody to go to YouTube and check it out. That really opened up my eyes. It was pretty amazing.

And I'm going to have my planting equipment there. And we'll just talk about what we've done to change with our planting, especially a lot of guys don't think about the high carbon to nitrogen ratio, so you get a little tie up. So we've done some things to mitigate that. And I'm pretty sure that's about all we have planned for that day, but if anybody wants the address I will put it on here. It's 3230 Rocky Ford Road. And that's Newton, North Carolina 28605.

OK, and thanks a lot. There's been several questions about copies of the presentation. And as Holli mentioned earlier, that's going to be available at the conservationwebinars.net.

And with that, gentleman and Madalene, I think y'all did a great job and I appreciate everybody participating on a Friday. Good crowd. So I look forward to the next one, which will be April 8 and our topic will be dryland farming from a farmer's perspective with Scott Ravenkamp in Eastern Colorado. And with that, we'll sign off. And everybody, have a good day.