With really reasonable estimates of cover crop biomass, you know, that's a really important outcome of cover crops. So that's what we're going to talk about on January 15 at 10 Am. Central time, and Nathan is going to get that information updated flyer to all of you. So, we are fortunate to be joined this morning by Rob Lawson, and he would love the opportunity to just say a few words about the series, and thank you all for being here, so I'd love to give Rob an opportunity. So over to you, Rob.

Rob Lawson- USDA/NRCS

Great. Thank you, Andrea, and good morning, everyone.

It's great to be here with you this morning. And you're, you know. Yeah, just wanted to say, Good morning, welcome. We're on the session 3 here, and looking forward to the dialogue between that we have between NRCS and UNL extension educators. But you know, just to set the stage again. I'm excited that we have this agreement. You know. The overall purpose of the Webinar series is to increase our capacity to promote and plan cover crops. In Nebraska as a State, we are invested in the science of soil, health, and the outreach that's needed to have conversations with producers about soil, health, and how it fits into their management systems. So, we also, like I mentioned, want to create this space for UNL extension educators to meet with their NRCS counterparts across the State and discuss the challenges and successes of soil. Health practices in their region specific to their regions. And that's it. That's exciting to be able to do that and recognizing that we, the success that we've had with these webinars, we're already strategizing to offer more webinars to further empower our staffs. And so, if anyone has specific topics in mind, definitely reach out for reach out to Nathan and he can take those and visit the with the team that's putting these on. And it's great to see that we have a date set already for session. 4. So, thanks for the opportunity to speak. And I hope you all have a great day and a great holiday season coming up. So, with that I'll turn it back over to you, Andrea.

Andrea Basche

Oh, yeah, thank you so much, Rob. And yeah, on the feedback front. It's a great point. I know that Nathan is going to work on trying to collect some feedback from everyone, and you know I should introduce myself again. I think many of you do know me. I'm a research and teaching faculty at the University. I've been here since the end of 2017. The last time Nebraska won a National championship in volleyball was my 1st year, so I really hoping for another one this week.

So, I've been here for about 7 years, and I've been teaching a cover crops course that some of the current staff now, who've graduated from UNL have been a part of. And so, we've really been inspired by that. I always, as an instructor, try to gather feedback from folks, so I don't know if, Nathan, you want to say anything else about that now, or just that, you plan to gather feedback, and we'll see how we can kind of continue this teaching. Networking space going.

Nathan Mueller (NRCS)

Yeah. Yeah. Well, I was excited. Just about this collaborative effort that already existed, and then be able to kind of leverage. Obviously, that my former colleagues in Nebraska extension, and making that connection, like Rob said locally with NRCS and extension across the State to talk those local discussions and just get to know each other and work with each other. So, what I'll probably do is put together a Microsoft forms, which is kind of similar to Qualtrics for the UNL folks.

To kind of something brief, but just to gather some initial feedback that we can then use to make improvements or slight modifications for future offerings. So that'll probably come out right after the 1st of the year. I'll be probably working on that next week. So.

Andrea Basche

Yeah, thank you.

Well, as we've done in our prior sessions, what we'd like to start with is a poll to see how many folks are here from different parts of Nebraska is what we try to do. As Nathan and Rob have said, we want to build connections with extension and NRCS is. It's not always as simple as we wish it could be, but we'd love to connect you in the breakout rooms with people who are in your area so Vesh if you could launch that poll. So, we'll just ask you to complete the poll, so that we have account of who is where and then who's a postdoc on our research project? Who presented our 1st webinar? He's running the back end of this, so he will create the breakout rooms, and we'll kind of direct folks where to go, based on where the numbers work out to be and who is here?

From which region. So, let's see, I see 22 people have, answered the poll. We've got 37 on, so we'll give everybody a chance to keep going. So, the schedule for the morning here is that I will present for about 30, 35 min from now and then we will move into our breakout rooms. We've got a series of discussion questions, and maybe actually Vesh. If, as we're going when you have a chance, you could drop those in the chat for us, just for people to see what we've given as a prompt. We've worked to assign some folks who could be kind of facilitators in those rooms to just help stimulate discussion. Take some notes. So again, we'll do that. By region.

I see 30 of 33 people have participated, so that might be enough Vesh for us to get a start on. You can either show the results or end the poll. So, we've got central, south, central, east, central, so we may. We may split up our East Central folks and maybe combine some other rooms based on the numbers. But I think probably that's enough for right now. So I'll move on, bash unless you want to leave this open at all any longer. But okay, we've pointed this out at our last calls. I want to point it again. I really appreciate the number of the extension educators who've made a

commitment to join us if you are within our Cs and looking to locate extension educators within your region. The Epd.unledu is a great tool for that.

And we do have programs across in extension a range of topics. So, it's not just crops, water, livestock. We have rural development youth programming. You may all be aware of that, but you can see those different categories and things from our search feature. So that is what I want to say there in terms of our regions and breakout rooms. But for now, sit back, take notes, and enjoy what I want to share with you next, which is a topic that has been on my mind to kind of put together in a presentation. So, I was glad to have this opportunity, because it is really a common question about cover crops. How do they pay?

This is, you know, we really built this series around with water, with yield. You know, these really common questions that we hear to just try to empower people with resources and some knowledge. So, what does the research tell us? What are some reports and information here about how cover crops can return on investment? So, what I want to actually start with is just a quick refresh of some of the summaries that we have from our 1st 2 sessions for yield and water.

and then I'm going to talk a little bit about what partial budgeting is, and give you some resources to utilize if they would be helpful to you. And then I've got some nice research and some different reports from publications about this question of how cover crops pay. And it is. It is a little complicated. Right? So, I want to make the caveat, too. I'm an agronomist, and I'm not trained in all the methods of economics, but I think that what you can see from the reports is a sense of the dollars and cents and the additions and subtractions and the categories that we include that is, does not require a lot of fancy methods or tools. It's really just like a keeping track. And how big do we make our circle around what our budget includes. So, I'm going to show you some research evidence reports there and then. I've got a summary for you, and then we'll move into our breakout room, so we should be doing that in about 30 to 35 min.

So, starting with our 1st 2 sessions, so what did we talk about in October to start. So Vesh put together a really nice presentation that talked some of the really specific processes. The ways that cover crops can impact cash crop yields. But one of the components of this was the fact that across a range of scales of research, so if we look at work that's been done on farms. If we look at work that's been done on experimentation, smaller plots. If we look at farmer surveys, we see a general trend that demonstrates that when we think about different crops, different cover crop species, that we actually see neutral cover crop effects. So, we sometimes hear about the negative effects, but really in totality, and we look at all the research. The effects kind of overall are fairly neutral. Of course there's a lot of caveats here, and I'll go into some more detail. So,

there's been some good work that has synthesized the impact of cover crops on corn yields when you follow corn with a legume species or mixture, usually that leads to an increase in yields grass species, especially when terminated later, before corn can lead to slight reductions in yields, especially in drier years. We know that's not uncommon for us with the variability we have in rainfall. and

I would say the same principles generally apply for wheat. This is studied a bit less. I would say the same, probably for Soybean. It's been studied a bit less than lots of people want to think about what's the impact of management practices on corn yields has been. But I do feel that from what exists with soybean that we generally cover crops can see a positive effect, and a lot of that is just the species effect a cereal rye cover crop before soybean seems to be less detrimental as a whole than on corn, so I would say that kind of for wheat and soybean a little bit less studied, but these are some general principles from the work, and that our sense really is this. that once folks can get past the learning curve farmers and researchers, and not to say that we are perfect in our executions of cover crop management that really those negative yield effects can be limited. So, the management is really important in getting through that learning curve. And I'll probably say it's about 3 more times today. But I do really feel the cost share opportunities that NRCS can offer is a really valuable tool from an economic standpoint to get folks through that learning curve, figuring out how cover crops can pay on their own operations.

So, I'm not going to go into detail on this slide. I just want to show you that this is a little summary of some of the research reports we talked about. I understand that on your portal. You've organized some of the papers that we've shared here, so you should have these as a resource. So, these are all experiments with cover crops and yield impacts in the State of Nebraska. Okay? And so that was October.

In November we moved into one of my favorite topics, which is cover crop impacts on water. Which again, another very common thing that comes up is that folks can be hesitant about using cover crops because they're worried about the impact of water use, especially that they will use too much water ahead of cash crop planting or for their cash crop growing season.

and it does turn out, of course, cover crops impact water, right? They can impact all elements of the water cycle. So that's how I started my presentation. If you had the opportunity to join or the opportunity to watch. Later, we think about the whole aspects of the water cycle. What's happening in the soil? What's happening with how much evaporation could be reduced or infiltration could be improved. So, this does to some extent complicate what the effect is of a cover crop on water, and then crop yields.

And there's a lot of positives here. Some of the things I've already mentioned that we see a lot of evidence, something that researchers seem to love to study. There's a lot of data out there about how cover crops can impact things like runoff infiltration water storage elements of soil hydrology with the potential to improve water storage. So, these seem to really point to a positive aspect of cover crop effects in terms of water.

and that research generally holds true. So that's like bigger picture. And when we zoom into Nebraska there's obviously have less work than what exists globally. So, we do see that cover crops can increase infiltration. We've seen that on farms and work that we did that was supported by another NRCS agreement that we've talked with this group about in the past.

One issue, though, is these drier years, that we can see some declines following a cover crop in cash crops in drier years. Now is that directly effective water? Could it be other elements like we talked about in the 1st video? If you think about just the biophysics of what's happening out in the environment? Right? Could that be contributing to nitrogen immobilization? Could that be about pests or other things? It could be, it could be about water, right? So that's kind of how I think there's all these categories of ways that cover crops could impact cash crop yields. But we do see this greater effect in some dry years, in terms of negative cash crop yield effects.

So, I would say, too, just from the work that we presented on that webinar, that the bigger risks are in drier years with later termination. a reminder about the importance of management. But I would also add a positive here, too, that water use in a wetted spring, or a wetter season could be a real benefit, right? So, this fall was a bit unusual. We did not have a lot of rain, really from late summer until almost November, but once we got to November it was still warm, and we did get several rain events right where, having that soil cover, having those seeds in the ground to really take off at that point would be beneficial. So

so, it's more complicated than just the cover crop using water. I hope that's something you will take from this session that we had in November. But there can be positives. And then, you know, some challenges when we have drier seasons or potentially later terminated, cover crops. And again, here is just a bit of a summary from the research that we presented in the Webinar in November. So, we have tried to get organize those resources for you. and I'm not going to go through all of them. But again, this is just hitting the finer points that I just emphasized with respect to some of the positives, or more complex story of cover, crops and water.

Okay, so that's my summary of our 1st 2 webinars.

And now I want to get into the main event for the day which is thinking about cover crops return on investment. And the 1st place, I wanted to start just something that I talk about with my 200 level students, something that we talk about with our cover crop course, which is this idea of what are the tools that we can use to understand the effects that cover crops can have on a budget. Right? So, one thing is a partial budget, partial budget analysis, so partial budget analysis is exactly what it sounds like, right? It is an estimate of partial costs.

and there's a lot that can go into a complete budget. So, I'll get into a complete budget. Next, I have a tool to help with that. But when we think about a partial budget, it's an estimate of our partial costs, and I really love this diagram because I think it does a really nice job summarizing the costs and the potential revenue for both having additions and subtractions being specific to cover crops. So essentially all the work that I'm going to talk about for the rest of my presentation is related to this partial budget approach. And so, as I'll show you, there's many ways that reports and research try to organize a partial budget. So, I'm showing you these categories here that I'm going to come back to a number of times. So, the positives here for costs, which means like adding costs, I shouldn't say positives, just say additions and subtractions. So, the additions of costs could be things like seed planting extra inputs.

The reductions in costs could be. If you are improving nitrogen, reducing tillage, lowering herbicide use right? So, we can think about how cost could be added or subtracted. We think about revenue. We could think about things like higher yields, or getting money from grazing from a cover crop or cost share programs. Right?

If we think about declines in revenue, we might think about some negative impact on cash crop yield. So, it's just a way for us to organize and estimate partial costs through partial budget analysis. And I also want to point to a really great resource to help us organize something that you might want to refer to, which is the Nebraska Crop Budget Platform, which is a platform for lack of a better way to describe it. It's really incredible if you are unsure of costs. So, this is developed over the year by Ag. Economists and agronomists and extension. They put this really detailed Pdf. Of many, many slides excel document of many, many worksheets that include some of the following things. So, I'm just showing you a snapshot of what this resource includes a table of contents. So, they include a detailed budget. You could think about it as partial or much more complete than the partial budget that I just showed in that diagram.

So, what this resource includes are different crops, different environments. different locations of Nebraska, different, really, scenarios, so to speak. And what you can do is pick one to get started with that might most closely resemble your environment or the environment of someone that

you want to help. And so, when I say, if you're unsure of costs, I have found it kind of difficult to come up with what our estimates of costs for well seed for cover crops is maybe not as complicated. If you're looking at websites for seed, but other things like herbicides, and you know what are common rates that people might use. It's all embedded in the worksheet. So when you dig down into the spreadsheets in more detail. I'm just showing you a quick snapshot here. And you could just look at that website or Google UNL Crop budgets and play around. With this.

you can see a lot of detail. And again, what I might consider a more complete budget because it's not just about materials and inputs, right. It's what you see kind of in the middle part of the screen here. It's also about field operations and equipment. So that's what you see at the top. So, you see those field operations there are numbered, and those numbers correspond. So, you see the numbers right here for field operations, and they correspond to different inputs or different products that people would use.

But it also includes at the bottom overhead costs like taxes. Right? So, they do a nice job of doing an estimate of what this is. A dry land environment in Eastern Nebraska. No, till corn soybean rotation. They're estimating 1 95-bushel yield. And so, if these were all your costs, what would that come out to? Is your cash cost, which is just everything except for ownership operating.

and your cost of production per bushel, which is such an important number to have a sense of. And so, these are just great resources to, as I've noted here at the bottom of the slide. Compare Changes in Management. If you only want to consider one element of your budget, be it a more partial budget, which is exactly what we think about with my agronomy students that we might think about, especially the materials and services you know how does using more or less fertilizer or herbicide or fungicide. How much does that impact yield? How much does that impact our cost of production? This budget, again, is really trying to go beyond that, encompassing your field operations overhead costs.

And I, just as I was putting this together, just keep thinking about, you know, like, what's the circle that we draw around our budget? Right? It's hard to get some numbers for the whole thing. You don't have to think about the whole thing. Necessarily the reports and research I'm sharing with you today. They all draw the circle in different ways. But this is a nice resource to help you think about. You know what might be included. What are common rates, what are common costs? They do this every year. It's just again a great resource.

And then I did. You know, with equipment, just one thing that I came across in preparing for today I found a nice resource written by some extension folks at the University of Missouri, and we'll include this in our resources for everyone. Which is, you know, this question of how we estimate or understand what are the equipment needs and costs for cover crops, at least for me, that can be sometimes a bit of a challenge. And so, this is just a really nice guide. It talks about what it would be, especially with respect to planting equipment needs, and they discuss some of the pros and cons of different equipment. They also include some ideas about economics. They have ideas, for, you know, modifying equipment or sharing equipment. So, it's just a nice resource.

Again, if you're thinking about how, you might give someone some advice, or just even educate yourself about what's a what are some approaches that people might use. I thought this was a great equipment related resource that did include some economics.

And then, when we just think about, you know the kind of direct costs associated with what does it take to grow a cover crop? We have to at a minimum account for seed planting and termination. Right? There's probably a lot of other things we might want to consider. I'm just showing you here some ranges from the one of the more recent surveys. So, they survey farmers who are working with cover crops. They've got some great information over the years in their surveys.

but this is one about cost of seeding cover crops. You can see there's always a range. That's 1 thing that makes this tricky to consider. How do we come up with these costs? I do really like to think about ranges as Medians and averages can be valuable. But ranges are really valuable, too.

so cost of seed is 10 to \$50. Seeding costs. You can see what termination costs can be. They might have a 0 there, especially if someone is not doing anything additional. If they're already planning an herbicide pass that would terminate the cover crop or be kind of a burn down preseason. So that would be a 0. So really depends on how people are managing right, and I've also noted some other considerations here about, you know, is equipment needing to be custom hired is the equipment already owned.

You know, seeding rates can be a great way to think about keeping costs reasonable for cover crops. If you are, you know, thinking about what your goals are, you may be able to seed less. If you are planting earlier. If you are drilling, you might have lower seeding rates, so cost species, goals, planting method. All are going to come into play when you're thinking about what the direct costs for seeding are, planting, and terminating cover crops. So, this is just a range. There are other resources that are out there. I think this is a nice starting point, and I know Nathan has had some resources as well, so this is not including even cost share. But I imagine many of you are pretty familiar with what the cost share rates would be.

and they do vary from year to year, as you all know, far better than I do. But really, some of those costs you have for kosher. You can see here how they would easily be able to offset most or all of these initial and direct costs for getting started with cover crops.

Okay, so that's what I wanted to share, just thinking about? You know, how do we approach this question? What are tools we can use, and what are some of the categories or elements that we want to include with respect to direct costs. I want to move next to what are some of the things that have been done to try to understand this question of what are cover crop returns on investment, and I thought I might start with something that my team and I did. That is not an official publication. I put this little snapshot here that I'm showing you together for a field day that I participated in in 2021.

So again, I'm approaching this question as an agronomist who finds it important to really think about numbers. And again, not an economist. I always feel there's a little bit of like consternation or frustration or discussion around, how would we put numbers to the things that we find valuable in the soil? They can be really hard to quantify or budget for.

but what my team and I did, and actually, just, you know, a side note of you know how our work evolves. We had a visiting scholar working with us in 2020. She arrived in February, and of course we remember what happened in March of 2020, right? So, we had lots of lab and field projects planned for her, and we ended up having to pivot her work to be more remote. And so, she helped with this project. And I just wanted to kind of build a bit of

just a template of what are some of the ways that cover crops can pay. And we started by just doing a search of what reports are out there. What news stories are out there? What have people talked about with respect to what are the categories that are included in different aspects of this question? And then, what are some of the ranges of the costs? And so, here's what we did. We just wanted to create again a spreadsheet that would think about some of these costs and then returns on investments, and we had a number of reports in our mind that we had already been familiar with. And then Danny, our visiting scholar, at that time did a keyword search with Google scholar that included some of the words, I'm showing you here just to get a sense of what is out there. Try to summarize all this again. This was a couple years back now. But what is interesting?

As I was building this presentation, I see that a lot of the categories and ranges are pretty similar to what we were able to find a few years ago. Of costs. Of course, costs change. Costs have gone

up for a lot of things, but I still think that categories and the ranges are really valuable. So, we put together, you know, for changes in costs, so that if you have more or less expenses. We found lots of reports that talked about changes in field operations, soil health related benefits as well as changes to inputs. Okay?

And then, when we talked about revenue. And this is very similar to what we found in other reports. People talk about a couple categories. They talk about the value that can result from improving cash crop yields savings or extra revenue from grazing or cost share programs. So, it's probably a lot of ways we could think about.

you know, cost revenue, you know. Here we're thinking about. If you're reducing inputs, we're putting that as a lesser cost. Right? So, these are some of the categories and the ranges. And there's a lot of information in this table. We're going to share our slides with you. So, you can see the sources which again include a lot more specifics beyond what I had on that last slide. And so, you can see those categories. I just talked about the changes in field operations. The soil health benefits, changes in inputs and the 1st category. These changes in field operations just to go into a little bit of detail here. They often came from in the reports that we found reduced tillage. when shifting to cover cropping and the soil. Health benefits are ones that we. We conservation-oriented folks in agronomy always want to see numbers put to, but they can be difficult to monetize. So, I think it's interesting here. If you look at the SARE report that I'm going to get to in just a minute. They put a number against what it would cost to reduce tillage, because your cover crop had reduced compaction. I think that's a really interesting example.

So, all of these resources have a lot more detail about how they came up with the numbers. And then we think about the changes to inputs. You can see nitrogen credits from cover crops. It's not even something I am dedicating a lot of time to today. But we can obviously think about a legume cover crop giving a nitrogen benefit. There's some resources out there to come up with estimates. If people are doing less fertilizer. For example, some farmers that I interact with talk about the benefits they've seen, especially for phosphorus. or maybe even reducing. Here's 1 that's what we're talking about reducing treated soybeans. So, a lot of ways in this changes to inputs. I like these examples. I think they're valuable reducing field passes.

Yeah, the way I kind of think about this. And when I think about some of the farmers that I interact with who are really, you know, monetizing cover crops. Well, it's not just about you know, things like, how much nitrogen can we credit from a legume? But it really feels to me like these are things that accrue with management and carefully executed management, as well as tracking of costing, is a really important point. These are things that are possible, but they do accrue with

the learning curve with the carefully executed management and tracking of costs. This is what I've seen to be the most successful. So, this is the revenue side of things, from the report that we organized, just expanding a little bit on some of those categories that we identified, which included grazing programs, the cost share programs as well as the yield effects. So

I do want to note really, briefly. Here, too. We tried to also note the period that people were using cover crops when we did this, because I do think it's not always extremely explicit in all these reports. But that point I made before about the accrual of benefits coming from careful management tracking of expenses. You know this last line here, this report. I'm going to get into it in just a just a bit. But this is an average of 9 years. He did some interviews with Iowa farmers. So these are folks who had a lot of experience with cover crops. Right? So, this increase in cash crop yield did not necessarily crewing in the 1st year. So

so that's what we try to do. And I want to point you to a couple more resources here that are highlighting again. What are some of the ranges. What are some of the ways that cover crops can pay? So, this was a really great SARE bulletin that I'm referring to hear about cover crop economics put together a few years ago. Now I wouldn't necessarily describe this exactly like a partial budget, but what they did was to highlight some of these scenarios or situations where the return on investment can be faster. So, you can see the 7 that they list here.

Some of them were included in the table that I already shared because we did include this report in our assessment. So, they talk about things like herbicide resistant weeds being an issue. The soil. Compaction is an example. cover crops going, coinciding to no-till, easing the transition to no-till incentive payments, etc. So, some examples where cover crops can pay more quickly.

and in the report, they have kind of a similar table that tried to summarize some of those scenarios in terms of just you know what are opportunities that cover crops can pay? I do really like, and you'll notice I'm finding. The more you look at reports like this, the more they have lots of asterisks and footnotes describing what were some of the assumptions that were used right? So, Let's just look at the 1st few lines of one of the tables that I've zoomed into here. I just try to make a little bit larger. What some of those assumptions were.

Again, many assumptions that go into building these budgets because situations can vary a lot. But I did really like these in terms of the level of specificity, right? So, for the fertilizer savings here. They're showing, you know, no savings in the 1st year, some savings in the 3rd year and more savings in the 5th year, and here they talk about this example that I just had mentioned about phosphorus savings. And I've seen that again from hearing that from farmers talking about how cover crops can make phosphorus more plant available and that allows them to apply less.

The weed control example is a similar idea that you have maybe less savings the 1st year more in the 3, rd more in the 5.th But this comes from an assumption that you might either reduce an herbicide pass, or eventually be able to use lesser expensive products. Right? So, I just really did like these examples, the specificity that goes into them a reminder of, you know, there's lots of assumptions. But I do think that these are, you know, based in practicality, and people who've again done that careful management, tracked expenses over time.

Okay. So that was the Sarah report. That is, I think, a great resource. And then I did want to also point to the link that I'm showing here, which is American Farmland Trust Building. These soil Health Case studies that these were published initially a few years ago. I've noticed, as I was doing my putting the presentation together, that they've continued to add to them. And they're definitely in the spirit of partial budgets. I find them a little bit more scenario based. And I think it's important to note that this is not solely about cover crops. This is looking at a farm that's considering a whole soil, health management system, right? And so, what American Farmland Trust did was they have at this point now 10 States and over 20 case studies been published or summarized between 2019 and 2022. And again, I know that costs change very quickly.

but that's why I think that the ranges and also, you know what the categories are valuable. In spite of variability and costs. Right? So, what this example found, and what they highlight here is that this corn Soybean farm operation was saving from their soil health management system. Their estimate was \$56 per acre improvement in their soil health system.

So, they basically identified. If you look at kind of where that came from, that it came from increases in yield less field passes and also decreases in costs for seeding, planting, and fertilizer. Right? So, I would say this example, at least, what they highlight feels less comprehensive to me, but it also highlights. Again, what are the categories? What are the ways that people are able to monetize their soil health system? So, this is a nice resource. I don't believe they have reports specific to Nebraska.

but maybe some examples, especially some are imagine that not our corn or soybean or wheat based. Some are based in other crops in other parts of the Us. But still I think, some examples that can be very relevant for us in Nebraska. So that was SARE American farmland trust. And I want to talk about 2 2 more things to talk about as I wrap up. But the Soil Health Institute put together a series of reports based on a series of interviews that they did so. This was a pretty large effort from Soil Health Institute. Actually, remember they are getting in touch with me way back to look for names of folks to interview. So, it's fun to see this kind of come all the way to fruition. So, they started interviewing folks. In 2019 2020. They published their results 2021. And I'm showing you on this slide.

They have a lot of reports. They have a lot of nice videos. So, they've built a lot of resources around their interview project. And so here is the way that they categorized their costs and benefits. Analysis, right? So, they talked about things like what we've already talked about, reduced expenses, additional costs and revenue changes, they kind of group things a little differently. So again, we're never comparing apples to apples, really. But again, they interviewed 100 farmers really across Corn Belt States, and they had 12 farmers in Nebraska. So, they have separate reports for the different States and for overall, so that 1st snapshot I showed you is from overall, and here I'm showing you some of the highlights from the Nebraska specific interviews, and they showed pretty impressive increases in net farm income from the farmers that they spoke to. And so, I do think it's important to recognize a couple things here and there reports that cover crops are not the only change in the interviews. It was really again, like the aft reports was kind of the whole soil health system. And again. That's how people are farming, anyway. But I do want to make the distinction. It's not just thinking about how cover crops can pay.

So, the farmers that they interviewed on average, had been using no-till for about 25 years in cover crops for 10 years, so we were not talking about people who were just getting started, a lot of the people who you probably. And we are probably interacting with at the university people who are curious, interested, and concerned about costs. These are people who have really figured it out already. Right?

So, what they estimated overall for Nebraska was a net income of increase, \$68 per acre for corn, \$49 per acre per soybean. This is really a huge increase. I'm showing you here, too, the geographic range. It was largely kind of South Central into Eastern Nebraska, where the interviews were conducted. And then I'm showing you the categories they include. This was neat because they did actually break this out, their budgets for corn and for soybean. which not every report has that level of detail, and their savings came from a mix of different categories. So, it was things like equipment. It was things like fertilizer and amendments. It was also within the pesticide category as well. So, they had the reduced expenses, they had additional expenses and additional revenues, right? So, they come up with a really nice number, and I did kind of dig more into their methods to try to understand. Exactly like is this, comparing some of the same things that other reports have, and I'm not entirely sure from what I found. But I do think that again, if we think about who is this population of folks that were interviewed, you can see really some of

the areas in a partial budget that really have the opportunity, as I'm highlighting here, to either lead to less expenses or greater revenue.

Okay, so the last resource I want to mention to you is maybe not as rosy. Maybe it's more realistic. I don't know how you want to think about it. I think that this is a nice and important resource to highlight for all of you, which was an effort that was made by some former colleagues of mine at Iowa State University, and led by an Ag. Economist named Alejandro Placino, and I actually remember when he started at Iowa State, I was finishing as a student about 10 years ago, and we had a conversation, and I think that helped contribute to his acquiring the seer grant that funded this work right. So, what they did was to work with about 15 farmers in Iowa to build partial budgets. So, they I'm showing you a snapshot of their 1st page of their publication. That's from a few years back now.

So, they built partial budgets with farmers using cover crops. and what they found is that their annual net returns for cover crops were negative for most participants. And so, what I think is important to recognize, and they note this in their abstract is that they believe their approach was more accurate because they compared management within the same farms, the same cost, right? So, it was a more like control and treatment kind of setup the way they describe it. Okay.

when I looked a little bit more carefully, what they did and what the Soil Health Institute did. It looked like this. Effort from Iowa had higher seed costs. Higher termination costs lower benefits. and they did count cost share. So maybe this is actually quite a bit more realistic to people who are getting started compared to some of the other reports that tend to focus on people who've had more experience and more time. So, I would say, the bottom line of this is, it really matters what you count, and how much you count it. And then thinking about those nuances of the amount of time that people have had experience with the system. So

I did just want to point to this website as well, which is something actually we use in our cover crop course to do a little lab activity around calculating net returns. I think it's a really nice resource. So, what they did is they turned those interviews and those ranges of costs into a calculator. This is a really simple tool. So, what you can see here, I just took one quick snapshot of what you do. So, you can enter some basic considerations, and then it will populate a spreadsheet with some mean and median values that you can pull in, or you can add them yourself. It's actually just a really simple way to think about some of the net returns. And so again, they are not always extremely negative net returns, but they're not showing plus \$56 per acre in production. Right? So, I did.

don't want to end on a negative note, but I think it's important that we are really practical about it. You know, people are getting started, and what are some of the things that they might be experiencing, and really from a cost standpoint, but also the value and the importance of the cost share programs. And what that can provide for people getting started.

Okay, so let me just try to summarize all of this for you, and then we'll get into our breakout rooms. So, what do we know? There's a lot of variability in some of these reports, right, that they don't only necessarily vary year to year, but they vary based on what we put in the big circle of how we try to calculate that budget, right? In spite of that, I still think that they can give us some reasonable estimates of what our costs plus or minus revenues plus or minus again. And then what are the categories within all of them? And what are the ways that you might start to talk about farmers that come into the office or that come to meetings about. Well, think about if you could reduce tillage, think about if you could reduce herbicide passes or track field costs, etc.

So, we think about what goes into partial budget for cover crops. We want to think about seed planting inputs, how they might increase or decrease. Same with labor or equipment. And then those same categories seem to come up time over time in these reports in terms of yields grazing forage cost share programs as ways that cover crops can pay back faster again. It makes a big difference how much you include in your partial budget, how you try to quantify benefits. We can see some big differences, especially in those last 2 examples that I shared.

I do think that this temporal piece, this careful tracking of management and your or, let's say, careful management and accrual of benefits and careful tracking of costs, all come into play when we think about the positive reports. And then, finally, here's just a summary of some of the resources that I've put together that we will make available to you. I didn't mention the ABC calculator tool. But that is another website that if you're really interested in looking at numbers or helping someone with the numbers, that tool pulls in kind of all that information from the platform. So, lots of reports and case studies. And then that I will invite Vesh, maybe to tell us about the breakout rooms, and how we are getting started. We're going to try to do this by region, depending on the numbers of folks who are here, and I would encourage Vesh as well to add into the chat. Maybe those breakout room questions.

So, for those who are facilitating or just participating can kind of keep those live for themselves. So, we'd love to hear your thoughts. It's just that we try to set up these questions. Not that you need tons of experience with cover cropping per se, but just what you've concerns. You've heard what you've heard from farmers who are participating in programs. And your thoughts on some of these metrics. Could we be better quantifying and accounting for some of the benefits that we know can accrue so alright Vesh, I'll let you share the update about the rooms. And yeah, we should be going where?

Vesh Thapa

Yeah, thank you, Andrea. Depending on the number of attendees, I have made just 3 rooms for this breakout sessions. We'll have east central which will be moderated by John, and then I have merged southeast, northeast, and southcentral into one, so this room will be moderated by Katja, and the last one will be southwest, central, northwest, and north central into one which will be moderated by Tuana.

Andrea Basche

Okay, great. Thank you. Vesh. So, if you want to go ahead and open those rooms, and maybe we will put that in the chat, too. So, John is East.