

Webinar Transcript: [America's Farms and Ranches at a Glance: 2022 Edition - YouTube](#)

Good afternoon everyone. My name is Valerie Negron, your host for today. On behalf of USDA's Economic Research Service, welcome and thank you for joining our webinar on the 2022 edition of ERS's *America's Farms and Ranches at a Glance* report, previously known as America's Diverse Family Farms. Before we begin, I'd like to remind you that this webinar will be recorded and posted on the ERS website next week. If you have any questions, please enter them into the chat feature at the bottom left-hand corner of the screen, and our economists will answer them during a Q&A session after the presentation. Today, our presenter is Noah Miller. Noah is an Agricultural Research Economist in the Farm Economy Branch of our Research and Rural Economics Division. His research focuses on local cash markets and the impacts of marketing decisions on farm Finance well-being. Thanks for joining us today, Noah; the floor is yours.

Thanks Valerie. I'll be presenting the findings from the 2022 edition of America's Farms and Ranches at a Glance report. The full report, which was published at 9 am Eastern standard time today, can be found on the Economic Research Service's website. The 2022 edition of this report describes the characteristics of nearly 2 million U.S. farms in 2021. Specifically, the report examines what farms produced, how much they profited, and their participation in federal agricultural programs. The report also provides some information on farm household well-being. There are new sections in this year's report that cover farm liquidity, health insurance coverage of farm household members, agritourism adoption, and input acquisition strategies. The data for this report comes from the 2021 Agricultural Resource Management Survey (ARMS). ARMS is a unique annual survey conducted by ERS and NASS, which provides information on farm businesses and the associated households of the principal operator. The 2021 ARMS was conducted at the start of 2022 and covers farm activities in calendar year 2021.

Before I present the findings, I'm going to go over some of the terminology that we used in this report. We define a farm as any place that sold or normally would have sold at least \$1,000 of farm products in a given year. This definition is quite broad, and it means many small farms are counted in the farm count even though they may have limited sales. I'll also refer to the term family farms. A family farm refers to any farm where the majority of the business is owned and operated by an operator or individuals related to the operator. The operator is the person making the day-to-day operating decisions for the farm. This means that the family farm definition ties farm management and ownership together. Under this definition, 98 percent of the 2 million U.S. farms can be classified as family farms. Next, I'll go over the farm topology measure we use at ERS.

The ERS farm topology measure is used to classify farms into more homogeneous groups based on one, whether the farm is a family or non-family farm, and two, the size of the farm as measured by the farm's gross revenue. Gross revenue is a measure of total income received by the farm, and as this is a gross measure, I should note that farm expenses are not netted out. For small farms, the farm topology measure is broken down further by the occupation of the principal operator. I'll now explain the farm topology measure in more detail.

The small family farms classification refers to farms that report annual gross revenue less than \$350,000 a year. These farms are then broken down further by the major occupation of the principal operator. The groups in which farming is not the major occupation of the principal operator includes retirement farms, and off-farm occupation farms. Retirement farms are farms in which the principal operator reports being retired, although they continue to operate the farm on a small scale. Off-farm occupation farms are farms in which the principal operator reports that they have a major occupation other than farming. Then of course there's also a third group which are those farms where the principal operator reports farming to be the major occupation. This group is made up of low sales and moderate sales farms. We define low sales farms as farms that have an annual gross revenue less than \$150,000. Moderate sales farms are farms that have an annual gross revenue between \$150 000 and just less than \$350,000 a year.

Mid-sized family farms are family farms with gross cash farm income between \$350,000 and less than \$1,000,000 a year. Large-scale family farms include both large family farms and very large family farms. Large family farms have a gross cash farm income between \$1,000,000 and less than \$5,000,000 a year. Very large family farms have a gross cash farm income of \$5,000,000 a year or greater. Non-family farms include a variety of farms where the operator does not have a majority ownership in the farm; these may be large farms operated by publicly held corporations. Alternatively, they could be a farm operated by unrelated business partners, or a farm operated by a hired manager on behalf of a landowner. Know that we've reviewed some of the terminology I'm going to turn to the results of our study.

This graph shows the division of farms, agricultural land, and value of production across the different farm types. The vast majority of U.S farms in 2021 were small family farms represented by the blue bar. These farms operated just less than a half of total U.S farmland and accounted for nearly 20 percent of total value of production. Large-scale family farms were three percent of all farms but accounted for 46 percent of the total value of production in 2021, the largest share of any farm group. They also operated just over a quarter of all agricultural land. Finally, we see that the majority of the farm operations continue to be family run operations. Non-family farms accounted for only two percent of farms, 10 percent of agricultural land, and 17 percent of total value of production. We can break down the third column in this figure, the value production data, further across the different commodity specializations.

In 2021 small family farms contributed the greatest share to total value of production for poultry and eggs, as well as hay, at 47 and 53 percent respectively. These shares are slightly less than the 2020 estimates. In other commodity categories apart from hogs and specialty crops, large-scale family farms contributed the most in terms of total value production. This was especially true for dairy and cotton, with large-scale family farms contributing at 69 and 73 percent share of total value production respectively. Non-family farms share value of production was relatively low at less than 20 percent for all commodities apart from hogs and specialty crops.

This next figure shows how farm profitability in 2021 varied by farm topology. Our measure of profitability is the Operating Profit Margin (OPM) which is calculated as the ratio of operating profit to gross income. Operating profit is equal to net income, plus interest, minus an adjustment for any unpaid labor. The OPM score is a benchmark for firm's financial health, those farms with

low OPM scores are at higher risk of financial stress. We use these OPM scores to divide farms by farm topology into high-risk, medium-risk, and low-risk categories. What we saw in 2021 was that a majority of small farms and non-family farms resided in the OPM high-risk category, as represented by the red bar. It is important to remember though, that small farms often rely on some amount of off-farm income which is not captured by the OPM measure. For mid-size, large, and very large family farms, we see in general a larger share residing in the low-risk category as shown by the green bar. The share ranges from 40 to 54 percent which is an increase from the previous year's data. However, even for these farms there remains a sizable share of farms that reside in a high-risk category.

Another measure of financial performance that we use is the current ratio, which indicates whether an operation has enough current assets to meet its short-term debt obligations. It is calculated as the ratio of current assets to current debt. A current ratio less than one suggests that a farm is unable to cover debt obligations through selling its assets and is at higher risk of loan default. This figure shows the percentage of farms in 2021 by farm topology that fell in this group, as shown by the yellow bar. As was the case with the OPM measure, compared to large-scale family farms, we saw a larger share of small family farms that were at high risk. However, for all farms the share of farms with the current ratio less than one, were smaller than the share of all farms that were in the high risk OPM category. One reason for this difference may be that certain assets, such as unsold commodity inventory, are excluded from the OPM measure but are included in the current ratio. I'd like to note that the current ratio does not include off-farm household income, which many small farms may use to cover a farm's debt obligations. We look at the farm household income in more detail in the following slide.

Farm household income can be decomposed into farm and off-farm income sources. Farm income is earnings to the principal operator's household from the farm business, and earnings from other farming activities such as rents received from renting out farmland to others. As this is a net measure, farm income can be negative. The main source of off-farm income are earned income such as wages, salaries, and self-employment income, and unearned income such as dividend income from Social Security or income from private pension plans.

This figure shows median farm household income in 2021 by farm topology in thousands of dollars. This data is compared to the median income of all U.S households in 2021, which is the horizontal red line, and the median income of all U.S households with self-employment income in 2021, which is a horizontal green line. We compare farm households with self-employed income because farm households are the ones that are most similar to other U.S households that own a business. In general, in 2021, farm households did not have low income. Retirement family farm and low sales family farm are the only two topology classes where median farm household income was below both the median for all U.S households, and the median for U.S households with self-employment income. Median Farm household income increased greatly by the size of the farm, with very large family farms having around 10 times the amount of household income that small family farms have. I should note that these trends are very similar to the trends reported in last year's report. Now I'm going to discuss some of the data from questions that were new to 2021 ARMS survey.

The 2021 ARMS asked respondents to indicate for different age groups the number of individuals in the operator's household that were covered by health insurance at any point in year 2021. This figure shows the percent of all farm households covered by health insurance by farm topology. Very large and large family farms reported the largest percentage of household members with health insurance at 96 and 92 percent respectively. Off-farm occupation farms also had a higher percent of farm household members enrolled in health insurance, although this may be due to eligibility for insurance from an off-farm job. Retirement and moderate sales farms were the groups that had the least number of household members in health insurance, although for all farm topology groups, this share was greater or equal to 80 percent.

The 2021 ARMS also asked whether operations had in the past four years participated in any recreation activities and/or agritourism activities on the operation. This includes recreation activities such as hunting, fishing or horseback riding; hospitality services such as hosting overnight guests or guided farm tours; and entertainment services such as festivals, rodeos, or petting zoos. In analyzing the data, we used different farm size categories than the farm topology groups used in the rest of the report, primarily because we found only a small share of operations participated in agritourism, and those that did, tended to be comparatively small operations.

This figure shows the percent of farms that were engaged in some form of agritourism in 2020 and 2021 by gross cash farm income level. Low-income farms here, are farms that report a gross cash farm income of less than \$75,000. Middle-income farms are farms that report a gross cash farm income between \$75,000 and just less than \$350,000, and high-income Farms are farms that report a gross cash farm income greater than \$350,000. year-to-year changes in farm participation in agritourism across the three income groups was quite small, at less than one percent. Middle income farms were the most likely to participate in agritourism at five percent, however, in absolute terms, 68 percent of farms came from the low-income category, followed by middle income farms at 23 percent, and high-income farms at eight percent. The average net income from agritourism participation across all commodity specializations was \$11,110 with specialty crop operations reporting the highest average net income at \$26,807.

Next, we classified farms that engaged in agritourism as agritourism farms, and those that didn't as non-agritourism farms, and compared marketing strategies between the two groups. Specifically, we examined the percent of farms that had direct to consumer sales. Direct to consumer sales refers to market channels such as farmers markets, roadside stands, you pick operations, and on-farm stores. This figure shows the difference in direct-to-consumer sales for the two groups, like gross cash farm income category. Across all income categories agri-tourism farms were more likely to have direct to consumer sales. We also see the likelihood increased with farm income, with 39 percent of high-income agritourism farms reported direct to consumer sales, compared to four percent of high-income non-agritourism farms. Though this isn't shown in the graph, across all commodity specializations, direct to consumer sales were highest in agritourism specialty crop farms, comprising nearly 25 percent of gross cash farm income on average.

Next, I'm going to discuss the data collected from ARMS on farms input acquisition practices. Price indices for production inputs rose an average of 21 percent in 2021 which may have

incentivized adoption of different input acquisition practices. These practices include forming, buying clubs, which are organizations formed by a group of operations to manage input purchases jointly; engaging in forward pricing, which is the practice of contracting the price of an input in advance that will be honored by a seller or retailer in the future; employing a farm management service to purchase inputs; negotiating price discounts with the supplier; or shopping around, which is the practice of searching for the lowest price for inputs across multiple suppliers. With the data from ARMS we can break down the popularity of these acquisition methods like ERS's Farm topology.

This figure shows the percent of farms that engage in the five input acquisition practices just mentioned. Across all farm topologies, the most popular acquisition practice was shopping around for the best price for multiple suppliers. This ranged from 17 percent of retirement farms to 62 percent of very large farms. For retirement, off-farm occupation, and low sales farms, all other input acquisition methods were practiced by less than 10 percent of farms in 2021 suggesting a high degree of input price exposure amongst these groups. Only eight percent of all farms negotiated price discounts, however this figure was much higher for moderate sales farms, mid-size, and large-scale farms, ranging from 20 to 30 percent in popularity. Of the farms that negotiated price discounts, 85 percent of farms also shopped around for the best price for multiple suppliers, which suggests that these two strategies may be linked. Buying clubs and farm management services were the least popular methods for sourcing inputs. However, the popularity of farm management services did increase with farm size, from 4 to 20 percent, between low sales operations and very large operations respectively. Finally forward pricing represented the second most popular input purchasing strategy for moderate sales, mid-size, large, and very large operations. Let's now examine some of the additional data on forward pricing that was captured in the ARMS survey.

ARMS asked Farms the month and year at which forward pricing for inputs used in 2021 production occurred. This question was asked for seed, fertilizer, chemicals, fuel, and feed. This figure takes the monthly data and combines it into quarters for easier visualization and shows the percent of farms that contracted these five inputs in each quarter in 2020 and 2021. The data on forward pricing of seed, fertilizer, chemicals, and fuel were drawn from row crop producers excluding wheat producers. The data on feed were drawn from livestock producers. Over two-thirds of all farms forward price seed, fertilizer, chemicals, and fuel in the fourth quarter of 2020 and the first quarter of 2021 combined; this is represented by the purple and light blue bars. In contrast less than 10 percent of these inputs were forward priced in the second and third quarter of 2020 combined, and less than 15 percent were forward priced in the second and third quarter of 2021 combined. This data suggests that most farms lock in input prices during or directly after the previous year's harvest. Since forward pricing involves a contractual obligation on the part of the farmer to pay a supplier, farm operations may only feel comfortable to forward price once a previous year's revenue has been realized. The data also shows that forward pricing for feed is considerably more spread out than for the other inputs, with the largest percent forward price in the third quarter of 2020, followed by the first quarter of 2021. The reason for this may be a less fixed production cycle for livestock than row-crops.

Seasonal differences in feed availability or idiosyncrasies in the feed Market in 2020 and 2021. Let's now turn to some of the results from the final section of the report on government payments and federal crop insurance.

This figure shows the distribution of government payments including Conservation Reserve Program (CRP) payments, working land conservation payments, pandemic assistance, and all other payments, as well as value production in 2021 across the different farm topology groups. Each payment category should sum to 100 across the topology groups. We see that the greatest amount of CRP payments, represented by the orange bar, went to small family farms in 2021. For larger farms, we see a reduction in CRP payments from midsize farms, at six percent, to very large farms, at one percent. In contrast to this, nearly two-thirds of working land conservation payments, such as EQIP (Environmental Quality Incentives Program) or CSP payments, went primarily to large-scale family farms, this is shown by the brown bar in the figure. Commodity linked payments and other payments are shown by the purple bar. We see that these payments follow closely the distribution of value of production across the different topology groups. Mid-sized and larger scale family farms, and non-family farms, accounted for 82 percent of total value of production, and received 78 percent of these payments. Finally, the distribution of pandemic related assistance is shown by the green bar, also followed by value of production with 36 percent going to small family farms, 56 going to mid-size and large-scale family farms, and nine percent going to non-family farms. Overall, 34 of all Farms reported receiving some type of government payment in 2022, which was a decline from 40 percent in 2020. Let's next examine the pandemic related assistance in more detail.

This figure shows a breakdown of pandemic assistance by whether this assistance came from the USDA or came from the Small Business Administration, or from some other federal state or local assistance program. The USDA programs are grouped together in this figure as Pandemic Assistance Programs (PAP), as represented by the blue bar. This includes the Coronavirus Food Assistance Program, the Pandemic Cover Crop Program, and the Pandemic Livestock Indemnity Program. The Small Business Administration Programs (SBA), as represented by the Red Bar, include the paycheck Protection Program as well as advances from SBA's Economic Injury Disaster Loan Program. 32 percent of all farm level Pandemic Assistance was received from USDA programs, 62 percent came from SBA programs and six percent came from other federal, state, or local programs. This is a switch from the previous year where the majority of pandemic assistance farmers received came from USDA's Coronavirus Food Assistance Program (CFAP). The switch from CFAP to SBA payments could be associated with the timing of enrollment, however. The Paycheck Protection Program was open from January 1st, 2021, through May 31st 2021; CFAP reopened from April 5th, 2021 through October 12, 2021. Now let's move on and discuss crop insurance in 2021.

This figure shows the distribution of crop insurance participants, the blue bar; harvested cropland acres, the red bar; and indemnities, the green bar, across the farm topology groups. The distribution of participants, harvest of cropland acres, and indemnities for federal crop insurance payments across the farm topology groups should sum to 100. Overall, 14 percent of U.S farms participated in federal crop insurance programs, however participation rates varied widely across

farm specializations. In 2021, 62 percent of farms producing major row-crops including cotton, corn, soybeans, wheat, peanuts, rice and sorghum, purchased federal crop insurance.

Participation rates were lowest at or under five percent for retirement farms, very large farms, and non-family farms. Taken as a whole small-scale family farms made up a majority of participants in federal crop insurance program but accounted for 25 percent of all harvested cropland acres and 10 percent of all federal crop insurance indemnities. Although midsize and large-scale family farms made up eight percent of all U.S farms in 2021, they accounted for 40 percent of federal crop insurance participants, 66 percent of all harvested cropland acres, and received 84 percent of indemnities from federal crop insurance.

That wraps up the presentation of the 2021 data. I will now highlight again some of the key takeaways from the report. To summarize, farming is still overwhelmingly a family business. 98 of U.S Farms are family owned and operated, and they accounted for over 80 percent of total value of production. Of these family farms, small family farms were the largest group accounting for 89 percent of all farms, and operating 45 percent of all agricultural land. The share of farms with a low-risk operating profit margin (OPM) varied by farm size in 2021. 54 percent of large family farms had had low risk OPMs, while on average, only 18 percent of small-scale farms fell in this category. This indicates that smaller farms are at higher risk of financial stress. Farm households in general are neither low income nor low wealth. The median total income of all U.S family farm households was over \$20,000 greater than the median income of all U.S households in 2021, with median total household income for all family farms increasing by over \$10,000 from the previous year. CRP payments go to different farms than other government payments. Small family farms received 84 percent of all payments from the CRP program in 2021 while working land and other payments went predominantly to mid-size and large family farm operations. Most of the pandemic assistance to agriculture this year came from the Small Business Administration. This was true across all farm topology groups, ranging from 50 to 74 percent of total payments depending on farm topology group. Across all farms, 62 percent of pandemic assistance payments were SBA payments. Finally, we found that in 2021, 14 percent of all farms participated in federal crop insurance, but for row-crop farms this figure was much higher at 62 percent. Indemnities from federal crop insurance were roughly proportional to harvest through cropland. Mid-size and large-scale family farms together had 66 percent of all harvested cropland acres and received 84 percent of the indemnities.

That concludes our report and is all I have today. Valerie, back to you.

[Valerie] Thank you Noah. Let's go ahead and open the floor for questions now. As a reminder, questions can be submitted through the chat feature located at the bottom left-hand corner of your screen. Before we begin, I'd like to introduce our panelist, Ryan Olver, who will be supporting Noah with today's questions. Ryan is an Agricultural Economist who also serves in ERS's Farm Economy branch, and one of the co-authors of this year's edition of America's Farms and Ranchos at a Glance. Thanks for joining us Ryan.

Now for our first question. Noah, you mentioned that farm income can be negative, was that the case for any of the farm typology groups in 2021?

[Noah] Yes it was. So we saw two groups in particular had a negative average foreign income. All farm occupation farms reported about negative \$315, and low sales farms reported on average negative \$334 in farm income in 2021. All other farm topology groups reported positive average farm income.

[Valerie] Great, thanks Noah. For our next question, what was the average income farms generated from agritourism.

[Ryan] Hi Valerie, I'll take this question Noah. So farms were generating roughly \$11,000 from agritourism on average, and that's in net income. Although there were a lot of farms that reported agritourism services, but also reported making zero net income that year, we can't disentangle those from people that were basically not offering those services due to COVID restrictions. So, the average figure stands at 11,000 for right now.

[Valerie] Thank you Ryan. For our next question, was there an increase in the number of non-family farms for any of the commodity groups in 2021?

[Noah] Yes. So, we did see an increase in the number of non-family farms for specific commodities. Hoggs saw the largest increase by about 20 percentage points, followed by specialty crops, and then dairy also saw an increase in non-family farms in 2021.

[Valerie] Thank you Noah. For your next question, do you know why retirement farms had the lowest percent of health insurance coverage?

[Noah] That's a really good question. So we don't have more specific data that allows us to pinpoint specific reasons why some people in the household aren't covered. So, we can't get a definitive answer, but there may be household members in retirement farms that are too young to qualify for health insurance, like Medicare, which you have to be, I believe 65 or older.

[Valerie] Great. Noah, for your next question, how many farms overall participating in agritourism?

[Ryan] Yeah, I'll field that question again. So, an estimated three percent of all farms are participating in agritourism. The majority of them are coming from the lower income proportions, so almost 70 percent, despite the fact that you're more likely to participate in agritourism if you are a middle sales farm, the bulk of those farms are coming from the low sales farms. About 70 percent.

[Valerie] Thanks Ryan. For your next question Noah, how much do farms rely on government payments?

[Noah] That's a good question, so the amount that they rely on government payments, um you know, your income will be a combination government payment as well as revenue gained from the farm. It really depends based on the specific type of farm, but government payments do impact income, so they are to some extent, yes, they do rely on it. As to the specific amount, that wasn't analyzed in the report.

[Valerie] Here's another question related to agritourism. What commodity specializations have the highest agritourism rates?

[Ryan] So for agritourism rates, hog farms are actually by and large the most likely to participate in agritourism. Specialty farms are about a third as likely, about 15 percent to 6 percent. Whereas the other categories of farms, row-crops and other versions, livestock, dairy, etc., are far lower than that. The income, however, is extremely different between specialty crops and hog farms. Hog Farms we're making on average much less...specialty crop farms overwhelmingly we're making far more than the average income, close to \$270 per Farm. Hog Farms on the other hand, were much lower.

[Valerie] Excellent Ryan. Here's another agritourism question for you. Would pick your own farm qualify as an agritourism or as direct sales to consumers?

[Ryan] I believe both actually. Pick your own farms would be direct sales, but if it was classified as some sort of recreation service as well, then it would also fall under agritourism.

[Valerie] Thank you for clarifying that. Next question. Noah, this was a record year for farm sector income, how does that translate to farms in your study?

[Noah] Could you repeat that, Valerie? I didn't quite catch the end of that.

[Valerie] Of course. This is a record year for farm sector income, how does that translate to the farm in your study?

[Noah] So, we didn't look to see how farm income impacted and operations behavior or its management. It wasn't covered in this report. Although it is a very interesting question, and I'd be happy to follow up with the person asking the question after today's webinar.

[Valerie] Thank you Noah. This question is from one of our viewers. They say "excellent presentation". Their question is related to... Will the questions about agribusiness remain in ARMS in the future?

[Noah] Valerie, did you say agribusiness or agritourism?

[Valerie] Agribusiness, sorry.

[Noah] Agribusiness, okay. Uh, no, you said it right the first time. I was just checking. So, there are questions that are repeated about agribusiness in ARMS. There's quite a lot so I won't go through all of them, but again if the person asking the question would like to follow up after the webinar, I'd be happy to discuss in more detail.

[Valerie] Thanks Noah. Looks like we have a few more questions. Here's a general one, what would you want the public to know or to keep in mind regarding this report Noah?

[Noah] You know, I guess I would say that one of the key takeaways from this report is just the breadth of farm operations across the United States in terms of basically every metric that we examined in this paper. Looking at things you know, including, like we saw that crop insurance looks quite different across different farm types; we also see differences when we look at farm

financial stress; and then there's just a wide variety of farms, and I guess that's what I would say. I would say that it's very hard to compare or take away like an average farm without looking more in depth in terms of the structure of the farm, the size of the farm in general.

[Valerie] Excellent Noah. Here's another question, farms engaged in agritourism seems like a really small share of all farms, and I believe this person may have been referring to agribusiness, unsure, but why does your report focus on them?

[Ryan] So to just clarify, if it is for agritourism, agritourism is increasingly recognized as an avenue for farm operators to supplement their income. As we said in the presentation, the average farm is going to generate close to about \$11,000, and actually, the low-income farms that participate in agritourism actually see an income increase relative to low-income farms that are not participating in agritourism. So yes, it is a relatively small number of farms, but for the farms that do participate in it, it does seem to be an income boost. Curiously, this is actually counteracted by middle and high-income farms that tend to actually have lower incomes relative to their agritourism, participating cohort. This is also the first year that ARMS has addressed this question, you know, agritourism specifically. As it's becoming important for, well it's becoming recognized as an important avenue for these low-income farms to make additional income, and we had access to this data, it became an interesting part of this presentation. That's why we decided to include it.

[Valerie] Great, thanks Ryan. Now for your next question, do you follow the same farms year after year in the ARMS survey?

[Noah] So, it's a sample that changes each year, and there is information on the ERS website explaining exactly our methodology, but typically we do not see the same farms in the ARMS survey year after year.

[Valerie] Thanks Noah, as a follow-up question to that, and perhaps this may also be on our website, but do you have statistics by state and county?

[Noah] So for this report, we did not break it down by state level information. There's other information on farm businesses that is available, broken down by state, and you can find that on the ERS website. I'd be happy to discuss after this call, with the person asking the question, and show them show them where exactly this information can be found.

[Valerie] Thanks Noah, looks like we have one more question. This listener says, just noticing that the input section does not include water, is there a reason for that or a way for us to evaluate how water plays a role in the business or decision of a farmer?

[Noah] So we did not ask any questions in ARMS in that same module that was looking at input acquisition strategies, in terms of water acquisition strategies. So, we don't have that in this in this report. We just don't have that information, although it is a really great question.

[Ryan] Actually, Valerie, would you mind if I follow up on that?

[Valerie] Yes thank you Ryan.

[Ryan] So this report was generated from the phase three of the ARMS survey. We do have some information on water consumption in the phase two part of the survey, however, it's not treated in the same way as acquisition of input. We'll ask questions about a farmer's use of, did they purchase irrigation, how much irrigation water did they use, etc., but it is not a farm-wide question, it tends to be a specific field. Because a farmer can obviously grow multiple crops and can have a very large farm, it doesn't generalize the same way to the entire farm, so when we use the phase three data, which does not contain this question, it's not exactly possible to use that water information in the same way that we've used this information here. So, I hope that answers the question.

[Valerie] Thank you for that clarification, Ryan. All right that's all the questions we have today. Thank you, Noah and Ryan, for sharing your insights, and thank you to our listeners for taking time out of their day to join us. We hope this has been helpful. If you haven't done so already, we'd like to invite you all to download ERS's new Chart of Note Mobile app. With this app, available free of charge on Apple and Android devices, you can receive digital snapshots of ERS research delivers straight to your mobile device. In addition to our website and charts of note, you can find more ERS content on our social media sites like Twitter and LinkedIn. Again, thank you for joining us today, this concludes our webinar.