

## Helping Farmers Help the Land Through Climate

Please stand by for realtime captions

Good afternoon and welcome to today's webinar called Helping Farmers Help the Land Through Climate Smart Farming. I am a national little resources specialist for the conversation services technology support Center and I will be your host. We will get started with the presentation and just a moment. Just a few logistical items for this webinar is recorded. All participants joining the webinar are in listen only mode and all audio was broadcast through your speakers. Pewter or mobile device headsets can help with your audio quality. We still want you to be able to participate in today's webinar. Please type your questions and comments in the Q&A pod . Amid these through the presentation. Questions will be answered at the end during the question-and-answer session. Note that the status bar indicator in the Adobe connect menubar. All integrate the connection. You will need a strong connection for best viewing. If you wish to make adjustments you can make them using the options in the window. If you choose to view the presentation in full-screen mode you will need to hover your cursor at the top of your window to see the option to return to normal view. You will need to be in normal view to see the Q&A, to type in your questions. If you're having challenges, there is a relay captioning link in the link pod appeared they open in a new window where you can follow along with their presenters comments. In today's handouts can you have today's presentation, as well as the resources list and PDF you may download and we also have a quick job aid for you, to help with continuing education credits for the webinar offers continuing education units. To earn these come at the conclusion of the webinar you use step two in the contribution webinar window to take a brief post test and enter the certification credentials and receive your certificate by email. We will submit your CEU on your behalf in 30 days. Please submit your conservation planner CEU in order to meet your local certification requirement. We encourage all participants to complete their webinar using the step to process should completing this is an opportunity to rate as using a five-star system and you can submit comments that are helpful to the webinar program. When rating the webinar will please focus on the technical training provided by today's presentation and what you learned by participated. The on-demand recording will be available from the webinar's webpage on the science and technology training library by next week. Finally, I want to remind participants that the use of trade names during the webinar is for information purposes only. Mention of a trade name does not constitute a guarantee of the product by the Department of Agriculture, nor does it imply endorsements by the department or natural resources conservation service of the products that are not named. With that we will now begin. I am pleased to announce that I will turn this over to Erin Lane. Erin works for that USDA as a coordinator for USDA Northeast climate hub and the North Atlantic fire science exchange. The current research is about soil carbon on farmlands in Vermont. You may now begin, Erin.

Thanks, Jennifer welcome to the Northeast climate hub web series B thank you all for joining us. I want to tell you a little about the USDA climate hub. We are a national network created as a collaboration of USDA agencies. We work in partnership with other federal, state and local governments , and private organizations. Our Northeast hub covers 12 states from Maine to West Virginia. And including District of Columbia. Our mission come with the USDA Northeast climate hub is to develop and deliver science-based knowledge and practical information, on climate adaptation and mitigation for farmers and land managers could with the name to support decision-making with the impacts of climate change. We are very excited to be hosting this webinar today. It's part of a series of informative webinars, which we hope you find valuable. Today, we have Elizabeth Marks presenting on climate change trends in the United States and how farmers can be resilient to them. For the past year, I have had the honor to work at the Northeast hub with Elizabeth. She has brought extremely connection that is valuable. Elizabeth serves as a biologist for USDA and NRCS in the Hudson Valley New York. She is a certified holistic management educator. She works directly with landowners to improve soil health and biological diversity on their farms and forests. Elizabeth has a bachelors degree in biology from Mount Holyoke College and attended Kings College London. She lives in Chatham, New York and a net zero energy efficient home that she designed her home self. She is truly an outstanding person and we are thrilled to have her present today. If you have questions while she is speaking, type them into the Q&A box. I will monitor those and read them out at the end. So welcome Elizabeth. We are excited to learn about what you have to share with us today. It is now time for the presentation.

Thank you so much for that wonderful introduction, Erin. It has been truly my honor to work with the Northeast climate hub and I also want to say thank you Jen for all the work you do, hosting these really great webinars. I am very excited to be here. Want to thank everyone from everywhere to join us. We are taking an hour out of your very busy day for yet another webinar. It is addressing climate change. It is such an important topic and I appreciate you being here. So, today's presentation is actually an abbreviated version of a full training that I have developed that will be in Ag learn for those FDA employees and the partners. It will be available later this winter. So this is just an abbreviated version but what we will talk about today, is

climate change trends over the last 125 years, in U.S.. Why these changes are occurring, and some hope. As well as, just touching a little bit on the climate smart farming. The full training has a lot more modules. Including modules for special considerations for faux it forest owners, livestock owners as well as getting into soil health a little bit, more in depth. Before we begin, I will just want to explain the difference between climate change and weather. Weather is happening at a certain point in time, whereas climate is a general trend in weather. In my job, with NRCS I work with farmers almost every day. I find most are noticing weather patterns changing because they are so connected to the land. However, using the word climate change may be too politicized and other terms may be more acceptable to them. You could consider using terms such as whether you want to use weather volatility, weather extremes or they may become more resilient to drought or heavy rain. Using other terms besides climate change may be easier for them to relate to. Even if the farmer's you work with are not convinced about climate change, there are many other benefits to reducing greenhouse gassing and implementing climate smart farming practices that it can improve farming under current conditions but some other terms are climate smart farming might be natural climate solutions, engineering with nature, weather drought resiliency or soil health. So, again, even if the people you work with are not convinced about climate change, and there are many benefits to some of the climate smart farming techniques I will talk about today. I find the best way to talk about climate changes to make it personal. What changes in weather have you noticed in your lifetime? I want to ask this to the folks who are joining today. If you could put in the chat box, what changes in weather have you noticed in your lifetime. Be sure to say what state you are in. So we also have a quick point question about what state you are from. We will see who is joining us. So, in Puerto Rico, hurricane says one. Sean says it was 65 degrees here -- I'm wondering if you can move this over. I guess I can move this over legacy the chat box. Pennsylvania, milder winters. Massachusetts, more rain in the winter. Sean says it was 65 degrees here in the Northeast yesterday. Yep, in December. More severe weather events. Less snow and cold weather and lack of true spring. I totally understand that. I just want to see where most of the people are from, and joining us. It looks like a lot from Pennsylvania, New York, that's great. New York and Pennsylvania seem to be and some people in other places. So, that looks great. If you could just minimize the state. Okay. So for me, I live in upstate New York and I grew up in the Adirondacks. When I grew up, and the Adirondacks come in the 70s and 80s, we did not have ticks. About 10 years ago, I was visiting someone from my hometown at Thanksgiving and I told them I pulled off a tick. I realized they have now moved into the Adirondacks because they are so much warmer. With that comes Lyme disease. I live about half an hour southeast of Albany, New York. It used to be that we would hear spring peepers in April but twice in the last five years I have heard spring peepers in January. And that was pretty shocking. To me as well. So thanks, everybody, for responding. So let's understand how the climate has changed over the last 125 years in U.S.. Most of the data in this presentation has come from the fourth national climate assessment published in 2018. The assessment is based on the findings of the U.S. Global change research program and is required by law to be published every four years. The U.S. global change research program is a federally funded program with contributions from many different agencies and partners including the USDA. Around the world the average global temperature has risen by two degrees Fahrenheit since 1880. You could see that has not been the same throughout the globe. We have some areas that are increasing more and some that might even be cooler for the majority of that rise in temperature has been since the 1970s. These increases in temperature have been observed in the United States, again, like the world, not all parts of the U.S. have been warming at the same rate. In the north, northeast and west, we've seen the greatest increases in temperatures. Upper Midwest. Where the Midwestern southern parts of the U.S. and southern parts of the U.S., especially the Southeast has the least increase. Some states like Louisiana, Mississippi, Alabama and Arkansas have each gotten slightly cooler on average. So increases in temperature have resulted in an increase in the growing season length, in California and Arizona, you can see from this map the growing season is almost 2 months longer than it was in 1895. In the Northeast, it is up to three weeks longer. So take a moment, locate your state. Again, looking at that Southeast, we've seen it either stay the same or even in some cases, the growing season length has shortened. And increased growing season means an increase in number of days when pests are active. In some places, mosquitoes are more active 37 more days throughout the year, then they were just 40 years ago. So see if your city or a city close to you is on the list. For New York, we've got Albany, near where I am. That is number 10. Syracuse is number 17. Rainfall has changed, too, with some places becoming wetter and drier areas becoming more dry. The Northeast, upper Midwest, that has seen a dramatic increase in rainfall. Where the Southwest and parts of the Southeast are actually getting drier. Especially that Southwest portion Arizona in particular. Not only has the overall amount of precipitation increased, the intensity of storms has increased. I think a bunch of you had noted that in the chat box this map shows the percent increase in the number of storms that result in very high precipitation. In the Northeast we've seen an increase in frequency of heavy rain events, heavy rain is defined as over two inches of rain in a 24 hour time. And there is an average increase of 71% increase in

the storms of the Northeast, since the 1950s. Again, some areas have not changed all that much. Including the Southwest. But we are finding in east, east of the Mississippi, these intense rainstorms are increasing. So, for the Northeast that's just an average. We are finding in more mountainous areas they have seen higher increases were along the coast, the increases have been more moderate. And again, the Northeast, one of the reasons why the Northeast is experiencing higher than average global warming is because the Gulf of Maine is one of the fastest warming oceans in the world. So, if you were taking this training in Ag learn or I was given this presentation to your particular state. I would go over the data for your state. However, for the purposes of this presentation I'm just going to use New York as an example. The information where I'm getting this information on state-by-state changes is from the NOAA state climate summaries. These are excellent 45 page fact sheets for each state summarizing climate trends that are occurring and I recommend that you go to this website and you just have to Google NOAA state climate summaries. You can download the state climate sheets for producers you work with. They have a lot of data and facts in them. And they have what has happened to date but they also go into future projections that I don't cover future projections of my training. So if you are interested in what is going to happen in the future, those facts sheets include that. So let's just take a look at New York and what is happening in New York. The average temperature has increased two degrees Fahrenheit since 1900. Average rainfall has increased 15 percents since 1895. With the highest increase happening in Central New York. So there are some part, around the Tug Hill Plateau that are getting dramatically big increases. 25% increase in rainfall whereas the coastal areas, the increase has been a little bit more moderate. What we do see is that there has been 143% increase in the number of days where rainfall has exceeded two inches in 24 hours. This is particularly problematic for farmers. You know, for drought and temperature increases, well, for temperature increases in particular, there's a lot farmers can do to buffer those temperature increases. If you are experiencing drought, you could irrigate but, it is really hard for farmers to adapt to the heavy storms that just wipe out crops. We are experiencing warmer winters and increased rain in winter and spring which means longer mud season and delayed planting. So in the past, where I am especially, we may have had frozen ground all winter. A nice layer of snow and now, we are in just this freeze thaw cycle all winter with a lot of rain. And then, so, wetter winters but also cooler, wetter springs and that has a big effect in delaying planting. Also, sea levels have risen 13 inches since 1880 and that is higher than the global rise of eight inches. So I just want to show you one of the graphs from NOAA in these fact sheets. This is the observed winter temperatures. You know, I mentioned that these temperatures in winter are warmer so think about, if you are in and Ag service professional and you are a planner, how will that affect your planning? If now you don't have this frozen ground, and layer of snow, how might you plan differently? If anyone wants to write to the chat pod, some ideas that they might have? I just see in the chat box that you see only -- can everybody see I am on slide 22?

Yes.

Okay great, sorry about that. Sorry about that. You can also follow along. I have a PDF of the presentation you will see it in the upper right-hand corner of this. With today's handouts. So if you are a planner, so Joe says earlier planting and Ag ordered training of water, sure, that is one thing. Anybody else, if you don't see frozen ground, what else might you plan differently? Anybody want to take a guess? Let's see here. Maybe be careful not to take advantage -- of the warmer weather and apply fertilizer. Oh, yeah. Irrigation, fertilizer up. One thing I was looking for was covered crops. This is where covered crops are extremely important is, if you are going from frozen ground covered in snow all winter, to freeze thaw, freeze thaw, with lots of rain, having that soil is really problematic. Yes, you hit it, covered crops to enhance the soil and keeping the soil in place. So why are these changes happening? The earth is involved in a layer of greenhouse gases that trap some of the radiation from the earth surface. The higher the concentration of greenhouse gases, the more heat that is trapped. This is kind of like the pickup truck effect. If you picture a truck parked in the Sun, it is much warmer inside with the windows closed then outside come even in winter. So how does this happen? Short wave energy from the sunlight can get in, when that solar radiation strikes the inside of the truck, much of it turns into longwave heat energy targets reheated back. Those longer waves can't get back out through the glass and the truck gets hot. The greenhouse gases act like the gases in the truck window and that is similar to what happens with greenhouse gases and the earth. We have greenhouse gases and where they coming from in the United States? The top to the top four are water vapor, carbon dioxide, methane and nitrous oxide. Greenhouse gases also include, to a lower extent ozone, chlorofluorocarbons and hydrofluorocarbons. Where they are coming from is predominantly transportation and electricity. That is making up the majority of where the greenhouse gases are coming from in the United States. Agriculture contributes about 9%. So for the last 2000 years, carbon dioxide and methane and nitrous oxide concentrations in the atmosphere were level. This is a graph showing the last 2000 years. So the vertical line marks the year 1880, at the end of the 1800s, levels of greenhouse gases begin to skyrocket as more gases are put into the atmosphere from the burning of fossil fuels. These fossil fuels come from manufacturing. We've

got the invention and widespread use of electricity. And the introduction of the automobile. And the increase in global temperature directly correlates with the rise in the concentration of these gases. If we look back over the last 800,000 years, scientists know from ice core data that the levels of carbon dioxide in the atmosphere, while they fluctuated, they never reached above 300 parts per million prior to about 1950. Since the 50s, carbon dioxide levels have risen dramatic we in fact, half of all human related carbon dioxide emissions occurred only in the last 40 years. So, we've got about 300 in the 50s at their current level is 412. We know that the increasing greenhouse gas concentrations in the atmosphere is making the planet warmer will but why do we see weather conditions that are wetter? Is the temperature increases, more evaporation occurs good and there is more water in the atmosphere. This creates clouds which includes the increased rainfall. More moisture in the atmosphere also increases temperature because water vapor is a greenhouse gas. You get this cycle. Why does it seem like we have more extreme weather? A few of you mention that but I've certainly seen that. Last winter I had a couple days at my house where it was -20 degrees and then a few days later it was 60 degrees. Most researchers think that the more extremes are happening because of him as the planet warms, the jet stream is wave year. Jet streams are the fast-growing air currents in the atmosphere caused by a combination of air circulation from solar radiation and the planet's rotation. The wave year the jet stream, the more the jet stream varies. So there is a thought that we have more extreme -- these weather extremes are reflected in the numbers of billion-dollar disaster events since 1980. The cost has increased greatly, even when adjusting for inflation. Some of this is because there are more people and we have more stuff. But much of the increase is attributed to severe storms. Clouds hold more water than they used to at warmer temperatures and we are finding they are moving slower due to changing weather patterns. Together, this means that storms are now dumping more rain at one set of particular spots. From 2010 to 2019, the U.S. had more billion-dollar disasters and flooding than the previous three decades combined. This just shows where those billion-dollar disasters are occurring. So if you find your state come you see Texas and Florida sees more of these disasters. So, despite all of this alarming information, there is reason for hope. And I have a lot of hope, especially when it comes to agriculture. I would like to share some of that with you, today. Knowing that climate change is human caused, it means that we as humans, we can fix this. In the U.S. we've made some really positive changes of the last 15 years. So, the president elect's plan for addressing climate change or some recommendations has just come out. If you come for those of you who are in the USDA, you could go to the Northeast climate hub team, Microsoft team, and get a copy of this report. But a lot of the recommendations are for the administration to really focus on climate change. Some other cool things is the U.S. hit peak greenhouse gas emissions in 2007. And we've been good doing better ever since, going down. Of course this year with Covid we saw the largest single drop in greenhouse gas emissions ever recorded. One of the major contributions, contributing factors to this decrease in greenhouse gas emissions is the decreased use of oil and coal power while renewable energy and more efficient use has been increasing. Here at USDA we have many initiatives and resources available around the topic of climate change and whether there is variability. If any of you have used some of these resources, please put that in the chat box. I don't know if, we have a lot of contribution finding that could go towards climate smart farming. Soil health is one of our big initiatives here at NRCS. Also, some of you might not know but NRCS has done a carbon mapping project about 10 years ago, mapped where all the carbon is being stored in the U.S., currently, in which land use. Typically or historically a lot of the carbon has been sequestered in the Prairie Plains, but now, because a lot of these areas are now being farmed, our carbon storages coming or happening more in northern forest. I also wanted to mention the climate hubs. This is the organization that Erin works for is the coordinator for the Northeast climate hub. I've had the honor of being the liaison to or for the past year, detail. They have a wealth of information. They put out a quarterly newspaper and they've got lots of archived webinars, fact sheets and scientific studies. They sponsored workshops. They've done case studies and they have these 316 virtual tours demonstrating climate adaptation practices. I recommend going to the website bid you will see in today's link, a link to their website. So, I want to talk just a little bit about climate smart farming practices. This is another thing that brings me hope. Because these different farming practices can help farms be resorted to weather volatility. They can put these things into place today to be resilient to all these changes that are happening. The cool thing is that many actions that improve natural resources not only strengthen the farm in the short-term but they also help store carbon in the soil. And decrease greenhouse gas emissions in the future. So, many of these farms may choose to adapt by increasing infrastructure such as tunnels, irrigation systems, and input such as fertilizer and pesticides however that is certainly one way to adapt to climate change. In my training, and in this presentation, I am concentrated more on the natural, improving natural resources. My cover three main things that farmers can do to be resilient to climate change. Addressed landscape vulnerability and improve soil health and increase the health and diversity of biological organisms above and below ground. Before we or I go into what works, I want to just touch on some things that are going to be increasingly problematic for farmers the first one is

leaving the soil bare. Fall tilling, mold board plowing, continuous tilling, continuous grazing, monocultures and crop fields devoid of natural areas. Forming slopes, floodplains, wetlands or other marginal soils. And claim it adaptations involving expensive capital. These are things that are going to be increasingly problematic for farmers. I often get asked, well, what, with the changing climate, what crops should I think about changing to? Or how should I change my cropping structure? If the advice I give is not necessarily come with the exception of a few crops, it is not necessarily what the changes and what you will plant. It's going to be changes in how you farm. What kind of practices you use. So let's talk about addressing landscape vulnerability and what I mean about this. So, this gets to the concept of areas that are hard to farm now are probably only going to get harder to farm in the future. This includes things like, if you have a problem with increased rainfall, you will have vulnerable parts of the farm more prone to flooding or erosion so the solution would be to take marginal land out of annual production and establish perennial systems. Some of this may include steep slopes, frequently flooded or ponded soil, shallow to bedrock soils and soils that easily compact. Perennial systems may include pasture or hay. Perennial crops such as fruit or flowers. Pollinator or wildlife habitat and conservation buffers. You can see some examples of perennial systems in this photo. Feel free to write in the chat box, if you have any other perennial systems that you can think of, in your neck of the woods. We have folks all across the country on today's webinar. So, another solution is to install these systems and these are systems that NRCS has traditionally been known for. So, installing grass waterways, diversions, contour buffer strips and water and sediment control basins. Anything to put on the land to slow water down and hold it in place. The next essential way to implement climate smart farming is improving natural resources by improving soil health. Again, I won't be able to go into all of this today because we only have a few more minutes. But, here are some ways you can improve soil health, increase organic matter, improve soil structure, keep soil covered and keep plants growing throughout the year. So, if anybody could just write in the chat box, what are some ways that improving soil health can help the climate smart farm? Anybody have an idea? Paul says keep soil cooler, yet. Greater infiltration, yes. With those pellets to mitigate those heavy rains. Yes increase rainfall and filtration rates. Protection of soil from any kind of drain.

This is all really great, drought resiliency, for sure. Yes it decreases compaction so there is an increase in infiltration. Increase soil organic matter to hold and cover the water. Increase soil structure and cover to decrease erosion. In providing cover to buffer rises in temperature. So, one of the things that I will just pull one thing out of that soil health or one thing that you could do to mitigate these increased soil temperatures. That is going to be looking at soil temperatures. So, soil temperature effects or can discourage and killed beneficial soil organisms as the temperature is too high. High temperatures can alter root growth and nutrient uptake which affects the field. It influences soil evaporation rates. So more water is lost the higher the temperature is. And I just want to show you, some of the effects of cover on soil temperature. This past June we had a really hot day. Here at my small little farm. The outside and that temperature was 93 degrees in the shade. So I took the soil thermometer I have and inserted it one in-depth into a couple of different areas. So I put it in some area of the pasture where the grass was 8 to 10 inches. The temperature was 83 degrees. 10 degrees cooler than the ambient temperature. Then I moved it over to the mulched veggie beds I have, about one inch of straw mulch on top. It was 90 degrees Fahrenheit. So higher but cooler than the ambient temperature. When I took the temperature of a part of my overgrazed pasture where the grass cover was less than one inch, it was 100 degrees. When I looked at the bare soil and a little touch of bare soil in my veggie beds, it was 115 degrees. When I took the temperature under a black plastic, the soil was 128. So what you cover your soil with, is going to make a huge difference in this case it was a 45 degree difference on a hot, sunny day. So -- we talked about the temperature affect on soil and biological communities. For micro organisms the temperature ranges between 50 and 96 degrees produced here to get soil organisms to die above 130 degrees. When that micro organisms like worms and the ideal temperature is lower between 50 and 75 degrees. Temperatures also affect growth. This is for soil temperatures. The ideal soil temperature is 65 to 86 degrees Fahrenheit good this is the ideal range for nitrification, plant growth and planting. Around 80 degrees, many plants reach peak growth of roots and plants and peak nutrient uptake and above 90 come you start to have plant and root growth slow and stop and conditions become unfavorable to soil organisms. This is just showing how soil temperature affects root growth in potatoes. So, soil temperature moisture, the higher the temperature of the soil, the more you are going to get the bath reading. On average in the Northeast, you will have full radiation but we have about a 1% per degree evaporation increase per degree Fahrenheit in the Northeast. At 68 degrees the soil temperature for most of the water in the soil is available for plant growth. As soon as you start increasing at 88 degrees you've got a 20% higher evaporation and then at 98 you've got a 30% higher evaporation rate. So you are losing a lot more water but the higher the soil temperature is, not the ambient temperature but the soil temperature. So the solution is covers well with mulch or plants. We are getting to the end of the presentation. I want to hold some time for questions.

Because I'm sure a lot of you got great questions today will run through a couple more things very quickly. The cover crops can buffer soil temperatures and moisture and this is pretty critical in the spring. It can help make the soil cooler and dryer in the spring and cooler and wetter in the summer than bare soil. And cover crops have the added advantage that improves energy flow by capturing the sun's raise through a longer period of the year besides just the crop. Has living roots which is a food source as well. I just love I want to show, I love this picture because here it is, in this field, early spring, hasn't had been a very long it and look how green this cover crop is in the cornfields. And it is so lush. There is an opportunity for a longer growing season, as we get increased temperatures. So that actually maybe one small advantage of climate change. That farmers can take advantage of. So the rest of the slides you can find in the presentation in today's handout. The third thing that farmers could do to be climate smart is increase biological communities above and below ground. This is a great sigh that takes a while to take in so I encourage you to download the presentation. But, there is also something happening below the ground, with biological communities. If you increase this come you can improve the biological communities which in turn help plants be more resilient. Of course, above ground, you could have biological communities, these beneficial insects help with pest control and also pollination. Because I am with NRCS, I wanted to mention some NRCS planning and resource for farmers. We have the nine step planning process and we have a lot of GIS layers, that can identify the marginal lands. We have a lot of funding. Particularly conservation technical assistance, the CSP program and other second help the farmer be private smart. We have several resource concerns, some of which are new. Such as aggregate instability, soil organisms lost and degradation. Weather resilience is another one we just added. As some of the traditional resource concerns, as well. We have a lot of common we have a lot of climate smart practices. I've listed some of the common ones. Some of which are new, such as soil carbon amendment, soil health conservation activity plan and soil testing. So in conclusion, I just want to say, the Northeast is experiencing increased temperatures especially in winter, more extreme temperatures, increased rainfall. Especially inland and mountainous areas and increased frequency of intense rainfall over two inches and a 24 hour timeframe. These trends will continue improving natural resources on the farm can significantly help the farmers be resilient to these changes. The bonus is, these improvements often reduce greenhouse gases. And, NRCS planners and other Ag service providers can help farmers adapt to climate change by addressing landscape vulnerability, improving soil help and increasing health and diversity of biological organisms above and below ground. All right so where to get more. This hour goes by very quickly. As part of my detail, I was given some in-state webinars for NRCS personnel. In some cases, they are inviting partners. So I've got Vermont, Connecticut, Massachusetts, Maine, Pennsylvania, all set up. New Jersey, Rhode Island to Maryland, Delaware and West Virginia, the dates are to be determined. I'm giving a presentation to the Cornell grass fed green up conference and there is a link to today's link for that. That presentation, they include some information I gave today but also, a lot of information on how livestock farmers can be resilient. The course in Ag learn is coming soon, hopefully winter 2021. As the Northeast climate hub website, that I mentioned. I also wanted to mention the Northeast climate hub both in teams. If you are a USDA employee, you can join that team. And there is some resources in there specifically for USDA folks on the link is in the today's link. I just want to end with the NRCS vision. Which is a world of clean and abundant water, healthy soils, resilient landscapes, and thriving agricultural communities through voluntary conservation. I love this vision. Love that we are working towards this. To end, I just want to say to all of you, whether you are a farmer or you help farmers, thank you for what you do. You know, we wouldn't be here if we didn't have things to eat. So thank you for what you do. With that, I will take questions.

Thank you, Elizabeth. That was excellent. So we are now opening up the questions and I do have a couple there. As a reminder, for those who haven't typed in their questions yet, go ahead and put them in the Q&A box. A really fantastic presentation, Elizabeth. Let's see, the first one came in from Alex and he is asking a question about the you mentioned, that areas devoid of natural areas can be problematic. And he is wondering why that is.

And that relates, Alex, to beneficial insect's. So if you have more diversity on the farm, a lot of research has shown that of 20% of the farm is in natural areas. Like hedgerows or fields, and forests you will get beneficial insects which will act as natural pest control. It's when you have this monoculture. The Northeast has a lot of great diversity and natural areas, the farms are smaller and we tend to have a lot of natural habitat. When you get to larger farms where there is not natural areas, then you have a decrease in natural pest control and a decrease in natural honeybee population.

Great, that sounds like what the answer is that they were looking for. I think it is asking, isn't flooding often attributed to urbanization and paid services?

Yes, absolutely. Definitely. The more services you have, the more flooding is going to occur. And that's another reason why, to be very conscious of these marginal lands and the prone areas because it is only going to get worse in areas where you are experiencing higher rainfall.

Okay, all right, thank you for that. Next is Dean asking the question, about carbon credit. He remembers seeing a news report of a USDA program to help farmers sell carbon credit and he's wondering about the status of US to mention that he thinks funding climate smart farming via other programs is a good idea but that the carbon credits could be problematic.

I have to admit, I don't know anything. Maybe you know, Erin. Did you want to answer this question? I'm not really familiar with carbon credit. I know what they are but --

I agree with Dean, that there is a lot to be learned. Before we can make that a viable program. I think the USDA is really careful about making sure any programs that rollout are scientifically backed and very data oriented. And research oriented.

I know the administration, the new administration is very much interested in that but I haven't heard any of the details on what that will look like.

Okay, Travis asks, are more USDA conservation assistant program dollars going to climate smart farming participants?

Not necessarily. Not necessarily. So we don't have an official sweep of climate smart farming practices but a lot of the practices we offer our climate smart. If that makes sense. We are just getting into the concept of climate smart farming. But I just lifted a lot of the practices just to show that a lot of the practices already have the considered components of climate smart fund.

Okay, great. Paul asks about the 20% factor, the idea that 20% of an area is natural and increases the beneficial insects population but he is wondering if you have any resources or source for that number.

Yes, so, if you download the presentation, that it has the reference for that.

Great. Okay, the conservation district in Washington state is the first conservation district in the country to offer a carbon credit program that restores urban forest areas and vital habitat. Great comment, thank you.

Wow, that is amazing. Kudos to you guys.

Kudos to conservation districts.

They are wonderful partners.

It looks like the climate will be more like that of southeastern states, do you use knowledge from those states to develop negation strategies?

Where do we go from discussing this yesterday, Erin?

I think there's a lot to learn from folks that are south of you. We certainly see this when it comes to invasive species. We see invasive species moving northward but let's use it, this knowledge for good. And get information from our southern folks or people just south of us.

Absolutely and Alex is posting great information about carbon credits pit we will see if we can get the link tied into this document. Any other questions? We are just about perfect timing, actually. Thank you guys for all the questions. If you have more you can follow up with us at a later date. We could try to answer your questions. You will also find the recorded webinar at the webinar website.

On behalf of the USDA and NRCS I want to say thank you to Elizabeth and Erin for take time out of their busy schedules to provide an excellent presentation about weathering the change, helping farmers help the land through climate smart farming. Thank you again to everyone for attending today's webinar. [ Event Concluded ]