USGCRP Listening Session Live Transcript

Session Theme: Global Change and Food **Session Date: 6 December 2021**

>> Hello, everyone. My name is Alison Grantham. On behalf of the National Academy committee to advise the U.S. Global change research program, I welcome you to this listening session on global change issues with a specific focus on food -related challenges and opportunities. Through trade in a global change research and use the results to create tools and assessments to help people make decisions in the context of global change. Through this session and others and this five-part series, we aim to connect more directly with users and researchers who are building on and applying global change information and tools in their work. And to gather insights and information that the USGCRP can consider as it plans implementation of his work over the coming decade. In these sessions, we are welcoming agencies that comprise the USGCRP, members of the National Academy to advise the USGCRP, of which I am a member, and all of you. Users and researchers who are engaged in building on and applying the types of knowledge and tools that the USGCRP is charged with developing and supporting. We recognize this is a national academies event on topics that are critically important to all of us, and we are trying this different approach for providing an engagement to support USGCRP in its work. Please bring your insights and enthusiasm to the session. So showing move ahead to the agenda?

>> Next slide, please.

>> In today's agenda we have a series of speakers who will provide remarks, all of whom expressed interest when registering for the session. Everyone here will have opportunities to contribute through an engagement platform that we will introduce shortly. Representatives from the USGCRP and the committee to advise the USGCRP are attending and listening mode today. Thank you for joining us and we look forward to hearing from you over the next 90 minutes. Next slide. To start I would like to acknowledge that while today we are gathered virtually the national academies physically house on the traditional land of the Nacotchtak and piscataway people past and present we honor with gratitude the land itself and the people who have stewarded it throughout the generations. We honor and respect the enduring relationship that exists between these people and nations in this land. We thank them for their resilience in protecting this land and aspire to uphold our example. We also acknowledge that our understanding of food and global change issues are closely related to and informed by indigenous knowledge and experience. I met many native communities are on the frontline of impacts from these changes. I am joining from New Jersey the traditional land of the Lanape people.

, Please. I and other members of the committee to advise the USGCRP are looking forward to these sessions to connect directly with researchers and users who are using and applying global change information in their work. As far as our regular meeting throughout the year we provide this another opportunities to engage with and hear from broad audiences to inform this important work. The goals of this listening session -- this series of listening sessions include gathering useful input for USGCRP for implementation of its work, making connections and expanding the group of researchers and users who are directly engaging with the USGCRP and its work. To recognize connections across researchers, users, and the themes of USGCRP work and product and to inform potential future engagement -- engagement mechanisms and opportunities including forms approaches and participants for such engagement. Today, we are seeking input on how USGCRP may implement its work to better understand and address global change issues. You do not need to be familiar with USGCRP to provide input. We are specifically seeking to connect with a broader audience in each session. If you're unfamiliar with USGCRP, we hope you have had a chance to view the introduction video on our event pages before this session or we encourage you to view it afterwards. In preparing for these listening sessions, USGCRP requested input and insight on the following themes to inform the implementation of its strategic priorities. Diversity,

equity, and inclusion, which actions should be prioritized to fully incorporate these values in research, community engagement, and workforce development. How do we implement them. Advancing science. What are the priority gaps and foundational science methods that require enhanced long-term investment. Use inspired research. How do we ensure that USGCRP science and products are better driven by and connected to users. Improved use of consultation, collaboration, translation, dissemination, and forming climate services and socioeconomic sciences integration. Socioeconomic sciences integration. What are the priorities for integrating socioeconomic sciences into our program and to inform critical decisions. Particularly helpful feedback might include ideas on emerging large-scale scientific questions related to global change and or response, especially those where interagency collaboration will be critical. Specific information on how science is or is not being used to inform response to global change and why and knowledge gaps and obstacles implementing scientific tools for knowledge. To ensure all have time to speak, we will be holding you to the five minute increments.

, Please. So there are other input opportunities. The USGCRP is seeking public comment on the prospectus for its national global change research plan, 2022 to 2031. The opportunity to provide comment runs through January 11, 2022. The prospectus can be accessed by visiting USGCRP's review and comment system and it was just posted in the chat. This is an open call. All comments must be input via the USGCRP review and comment system by 11:59 Eastern time on January 11, 2022 for consideration. For more information on this call to comment, please see the Federal Register notice or visit the USGCRP website. When these listening sessions may help inform the implementation of this plan, individual feedback on the prospectus should be submitted to the public comment mechanism. In support of the fifth national claimant assessment, USGCRP the national climate assessment authors will host a series of workshops in January and February to solicit feedback on climate change-related issues that are important to the public. The information gathered in these workshops will help the authors determine which topics to cover in their chapters from the fifth national claimant assessment fee at the USGCRP website for information on these websites and Malique is also just shared in the chat. Okay. All right. Expectations for conduct. We are committed to fostering a professional, respectful, and inclusive environment where all participants can participate fully in an atmosphere that is free of harassment and discrimination based on any identity-based actors. Please report misconduct immediately. To Steven and his email is here. In the national Academy policy on preventing discrimination, harassment and bullying is also available on the events page for the listening session. Sorry. Stephen, did you --

>> I will take it from here. I would like to now pass it back over to Steven.

>> Thank you for joining and, Alison,.welcome on behalf of the committee. For these listening sessions, we have a couple of modes to hear from you and for you to interact with each other. For the rest of the session we will hear from participants who indicated during registration and interest providing oral comments. At the same time, we have available the Zoom Q&A mechanism to capture key points from speakers and contributions from all of you. If you have any issues with either this Zoom platform or the human day please send a chat to the host via Zoom or an email to Bob Greenaway whose contact information is listed on the slide. Today, we have a series of speakers who will provide oral remarks on the theme of global change and food. The first set of speakers were the first ones to indicate during registration interest in providing oral remarks. The speakers will all appear with video. We have throughout the session close captioning available. The live transcript is available to the live transcript icon in the Zoom menubar. Also through they Zoom platform we will use the Q&A functionality for

input to USGCRP from anyone who is participating in today's session. Despite the human day in the title in the name of this functionality, we are looking for your thoughts and recommendations and guidance to USGCRP on this or other global change themes rather than questions. As Allison indicated, USGCRP is here in listening mode and will not be answering questions. So we look forward to your input through the human day window and again, we are looking for your thoughts and recommendations on your work going forward rather than specific questions. I would like to invite Amanda on just to talk about how we are handling the last part of the session.

>> I just wanted to indicate as Stephen mentioned that when people signed up to attend, there were folks that indicated they wanted to provide oral remarks, and we do have a number -- a couple of the people who indicated they would be joining who are not online yet. And so in anticipating we might be able to move to our waitlist which we also have a couple of people listed there. Also just wanted to generally make sure that everyone knew that platform will be available because we are anticipating to have a little bit of time left at the end after all of our speakers, so if you have questions that you would like to give and you did not indicate that you want to do when you register, that's fine. We will have the ability to either allow you to unmute yourself and provide us comments or promote you to be a panelist after we get through this latest speakers we have lined up. So that's just a note to generally prepare yourself if you would like to speak. You will have an opportunity as well.

>> Great. Then next slide, please. And just to note that this is a public session and we will be recording the session for future reference as we consider the input that's provided, and just please take note of these disclaimers about in particular the contributions and comments that are made during this session will be part of the public record. And finally, that today's presentations and discussions will be presented to the committee. A are not opinions, findings, or recommendations of the committee. So with that, I would like to invite Mike from USGCRP to provide a welcome on their behalf.

>> Good afternoon, everyone. My name is Mike Kuperberg. USGCRP is managed by the subcommittee on Global change research which consists of representatives from the 13 federal agencies that make up the program. You can think of this subcommittee as the Board of Directors for USGCRP. I am here today representing those 13 agencies, and we want you to know that we are serious about our legislative mandate which is to assist the nation in the world to understand, assess, predict, and respond to human induced and natural processes of global change. On behalf of USGCRP, thank you for your interest, for your time, and your expertise. Your input will be heard and considered as we draft and implement a new 10 year strategic plan for USGCRP. In addition to the staff from the national academies there are a number of federal agency representatives and from the U.S. coordination office for USGCRP on the line today. They will be listening carefully and taking notes that will inform our discussions in writing for the new plan. That new plan will be completed late next year between now and then you can comment on a prospectus that is a high level outline of the plan and the prospectus was released for public comment today, I'm happy to say. That's out on the website and I think April put a link to that prospectus in the chat. A full draft of the plan will be released for public comment and for review by this committee of the national academies in the middle of 2022. Please take advantage of these opportunities to provide input and comment to us. We do want to hear what you think and what you have to say and we will take all of your comments into consideration. Finally, on behalf of USGCRP, our sincere thanks to you to take the time to talk to us today to the committee to advise USGCRP and the staff of the national academies for organizing these sessions, specifically, I want to thank Alison for being the host today and Steven and April and Amanda for all of the work they have done to organize these meetings and to

support the committee itself. I also want to say thank you to Katie Reeves and Julie Morris from the global change research programs national coordination office for their roles in making this happen. We look forward to your comments and suggestions. Thank you again for being here. Steven?

>> I would like to invite Alison back on to introduce our speakers.

>> Awesome. I am here and I would like to welcome Meghan as our first speaker.

>> I appreciate this opportunity to provide comments and look forward to hearing other comments as well. And speaking on behalf of the Center for global system security at Urbana-Champaign and we have recognized some large-scale scientific questions related to global change we believe need to be addressed. In one of these is trying to understand the balance between efficiency and resiliency within the food supply chain. When it comes to managing risk. The one thing we are all familiar with is that we currently still live in legacy programs that are set up and built on understanding efficiency within the supply chain and that we need to move beyond that and build a resilient food supply chain, but this is going to require technology and analytical tools that can allow companies and governments to assess the risks as we move across the continuum from efficiency to resiliency under varying environmental circumstances. We believe that although it's very beneficial to start from scratch with building a lot of these tools that one way an order to move this pastor could be by expanding existing analytics and insurance or an investment analytics that are used for food or food companies. We also believe it's important to include on the sufficiency to resiliency in a very broad term everything as far as resiliency from producing food from the transportation logistics to also the resiliency of community food systems. So we want to integrate the socioeconomic components into this balance and in doing so, we believe we have to ask questions about how will the cost burden be distributed if we move towards a more resilient framework and this includes ensuring small and medium companies have the same opportunities as large-scale businesses and that the cost burden really isn't just carried solely by farmers or by consumers. One of the other things we're seeing is that as ESG or environmental social governance expands including the projected securities and exchange compliance for the large companies, we understand that then there is a need for increased technology in measuring a number of the different climate variables from on farm to farm to table transportation. This includes currently even with any sort of compliance. Not necessarily anything beyond that. So we need to figure out the sensors that are necessary some of the different logistics and analytics that are required in order to measure additional variables under this kind of ESG reporting is going to continue to increase. We also believe that along with this and should just be those climate variables. We need to ensure that there's the social part of this as well as the governance and again, expanding into variables for economic and social systems. With moving this forward, we understand we need to have standards on how to measure and how to report this type of compliance as well and that we think this needs to happen at the industry level not necessarily from the national Institute for standards and technology because we believe that the technology continues to increase at a rapid pace. Something that we believe there's a huge gap and as large-scale public-private partnerships. We think that these are important just like what we are seeing today because it allows for diverse viewpoints to be put forward but also we think that these public private partnerships are critically important because we need data across each of these companies public and private and across the entire food supply chain in order to analyze these data as a whole. Because the data is much more valuable if we can aggregate it and see the whole system. We believe this will help us to predict and forecast as well as to adapt and mitigate to any sort of climate change or any other sort of global change that we are going to see over the next many years. We also believe it's

important to have these public-private partnerships because this will allow us to have a greater data exchanges across the supply chain. We currently see that each sector in each company tends to work independently and that if we want to be able to have transparency in the food supply chain map to have some kind of data interchange from each sector or each company across the supply chain. In order to move this forward, we know this is a long-term solution to vary long-term challenges and we need to develop a workforce that is diverse. We have to be able to continue to push stem research both natural and social sciences as well as systems level thinking through K-12 does well -- we also need to provide some opportunities for these diverse students to the exclusions and provide global to enter into career pathways and global change research. Thank you so much.

>> Sorry for the delay there. I would like to thank you very much. I would like to welcome the TCM from the American Cancer Society.

>> Thank you. I'm research at the American Cancer Society and I did watch the video before the meeting. We are especially interested in the enter agency role. We know that our current food system encourages -- also huge environment social impact. So we would need more research or more methods for estimating as Amanda was saying the health and social costs of the current food system. Also through food labeling and what type of products are due and we can increase the diversity not only from subsidized costs but also -- they current health to date the current food system also impacts the health of agricultural workers and communities making around where food is produced. There is increased exposure to pesticides, antibiotics and the manure from the waist produced by food products. So I think we would like to see more research. I've estimated the true cost of the current food system not only consumption but the health of people who are eating the food and producing the food the environment and the society and the government's role normally is funding research but also regulating the type of food that is available. The food label and food advertising and enforcing some of the clean air and Clean Water Act with regards to food production. And also the role as consumers as some incentives for school consumption, children's consumption of food.

>> Thank you so much for those comments. I would now like to welcome Michael to offer comments.

>> Thank you for the opportunity to share thoughts with you. They pertain to the opportunity to turn to the ocean when we think about food, energy, climate medication, climate adaptation, and related nexus says. The ocean covers 70 percent of the earth's surface and therefore receives about 70 percent of the sunlight. In the ocean contains about 97 percent of the earth's water, yet it produces in less than two percent of men's food. Instead, currently, we use some 70 percent or so of the water and 40 percent or so of the land to produce 90 percent of our food. The land, however, and the C systems are complementary, especially when we think about climate resiliency and the need to be diverse to produce healthy diverse food. But what the sea brings is to imagine a full production system that uses no or little land, no or little freshwater, needs no or little fertilizer, and is a system which is largely immune from floods and droughts. So in that way it's very complementary to what we do in agriculture. 2021 is the first year of the international decade of ocean sciences for sustainable development. This platform provides an unique opportunity for global discussion of the future of ocean-based food production, conditions -- connections such as this can also help increase the interaction of the producers of science and the users of science and international effort is also likely going to be the best option for the U.S. to advance in this field. Just based upon a back of the envelope calculation with a quick Google search of budget numbers for Noah and USDA it appears for every dollar they U.S. spends on marine research and development at the federal level, it spends about $50 on fisheries management issues.

But even more lopsided for every dollar of Marine aquaculture spending, we spent on the order of $5000 for agriculture. This is likely similar for other countries in the Western Hemisphere as well as the EU. And it's probably roughly proportionate to the value of those industries. But is not necessarily appropriate for the potential of each industry, especially when we consider food production in a changing climate. The practical result of this is to obtain the critical mass of science needed to make significant advantages we need to cooperate and that needs to be on the international scale. And finally, at the meeting they join the high-level panel for sustainable ocean economy. This effort was led by the heads of state from 14 different countries prior to cut 26 and grew significantly as a result of other countries including the U.S. joining. The high-level panel sees the ocean as an opportunity to use aquaculture as a way not only to provide sustainable blue foods and quantities of significant amounts to feed humanity for the next half a century but also as a way to fight climate change. I suggest the USGCRP take a look at the work of this panel is a potential roadmap that can help humanity deal with climate change and continue to thrive in the process. Two takeaways are the ocean is more than a victim of climate change. It has the potential for being a superhero in mitigation and adaptation. And provide healthy sustainable food at levels on par land-based food production by focusing on Marine aquaculture. Given the small effort that the U.S. in Western countries have made to develop ocean-based aquaculture and its rudimentary level of development, it will take a world effort to move forward. However the fact that additional -- gives us a blank slate to build and use inspired sites that include social and economical topics and addresses issues including those of environmental social justice and diversity at the start. Thank you.

>> Thank you so much, Doctor Rust, for your comments. We will now move on to Gi Gi Cohen at the University of Maryland.

>> Thank you so much for this opportunity. I am Doctor Alan I am a social scientist at the climate assessment for the Southwest program which is a NOAA research program house at the University of Arizona. And over the past year and 1/2, I've been working with people across all modes in southern Arizona we've been investigating the impacts of COVID on these for systems and looking for evidence of resilience within these systems in the face of the COVID crisis. Green lessons from these pandemic responses that then might also apply to climate adaptation responses. Some major points of sharing today both stem from that research. My first point focuses on applying climate research to the needs of next generation farmers and ranchers, especially those who produce a local and regional fruit system contexts. Many young farmers are highly concerned about climate changes to water availability changes to soil health and they really want to and are trying out ways to grow food that conserve water and grow food in ways that conserve water and improve the soil. The national young farmer and rancher coalition has done a lot of work to support these next generations of farmers and ranchers and at a recent survey of the members they found that water availability, climate change, and drought are among the top agricultural concerns of young farmers in the area the U.S. West. And many of these farmers are trying to implement climate adapted techniques on their farms like water conservation and efficient irrigation systems or building soil health by incorporating practices such as cover cropping, crop rotation, rotational grazing. In terms of climate information needs, this group is a perfect match to engage around the types -- bring about the types of information that would be useful and could be helpful in identifying future research needs. They have also been systematically under resourced as many of these young farmers and ranchers do not typically come from generational wealth or even from farming families. So they have to find ways to buy or lease their own land and access water as many of

them are typically smaller to medium sized businesses. They also been underserved by state Department of Agriculture and the USDA both in terms of financial support and also in research technology development and information. There are several agricultural workforce development programs in various states. New Mexico is implemented one last couple of years and Arizona just approved the program this past summer and is a really good start to create new opportunities for you farmers and ranchers. Especially people who have -- who are underrepresented in agricultural systems. So these types of programs -- hours is run to the cooperative extension program -- they can really benefit from targeted regional climate change and adaptation information and research. My second point is, although we tend to emphasize connections between climate and food production, obviously for good reason, we need to expand our understanding of climate impacts to the other notes of the food system, namely distribution processing and waste. Two of the biggest issues that we have heard from people who work in the food system here in southern Arizona or around food storage and transportation, increased heat impacts the shelflife benefits of both fresh and dry goods and this is already having an impact on distribution here for both food retail and for food banks and food pantries. As well as an increased need for adequate cold storage and cooling during transport to ensure food safety and so that food does not go bad during the transportation process. Also climate related safety issues include increased dust storms on the road during transport as well as impact on the paved roads and transportation infrastructure, higher maximum and minimum temperatures increase the use of air conditioning and business establishment or distribution of processing facilities which drive energy consumption and costs and all those these impacts are not unique to the food systems any breakdowns in these areas can have huge impacts on our food supply chain as we seen and continue to see throughout the COVID pandemic. And, of course, food waste is a huge issue as a contributor to admissions and there are several promising avenues to deal with waste that need to be implemented and also evaluated across the U.S. Thank you so much for this opportunity.

>> Thank you. I just wanted to give a heads up we will have some time for contributions from the audience, so for those of you who are listening, we welcome your input as well and after the next speaker or two we will ask for interest from the audience. So Allison, if you can go ahead with the next speakers.

>> Our next speaker is Doctor Franklin even in (unintelligible).

>> Over to you.

>> Thank you for this opportunity to speak this afternoon. As Allison mentioned I work for the sustainable agriculture which is active in Pennsylvania and the Midatlantic and we provide training, research and technical support for all matters of farmers from small vegetables to large crop and dairies. One of the activities I've been really engaged with has been a citizen science soil health project called a soil benchmark study and through that have been talking for years with farmers about soil health and climate adaptation and wanted to make a few points related to that. The first is just that it's very clear and I know that the data that this program has helped provide makes very clear is that climate change in the Northeast, one of the most visible and extreme aspects of that have been the changes in precipitation pattern with more and more of the rainfall coming in very heavy, sudden doses and being quick and predictable in times -- unpredictable in times of its timing during the growing season. This is creating lots of challenges for farmers as they increasingly try to figure out how to fit more operations into a narrower and more predictable range of field readiness days. And so just one trend I'm aware of how this has played out as we've been seen it can build soil towards annual crops because it's become

quite difficult to manage multiple cuttings of hay. There are lots of trends like this and I think it points to a real need for research both in terms of decision-support tools that could help farmers understand trends and changes not just in things like -- frost free days but field readiness and precipitation patterns. And other technologies that can manage extreme rainfall very intensive interventions. It's common in the Northeast but other things like more research into cover crop genetics that might provide the second point I wanted to make is in this region and I know throughout the country farmers are getting more interested in ecosystem services especially carbon credits and I wanted you to know with my experience measuring carbon and I know from many colleagues, just wanted to voice a lot of skepticism about the ability to really do that at scale in terms of measurement and verification for carbon markets. I wanted to encourage this committee to do further and deeper research into the viability of national and international carbon markets and we are thinking about investing public dollars, kind of the return of investment of four ecosystem versus payment for practices which we have much more experience with programs like CSP or equip which could be revitalized in a number of ways. And then the last comment I will make and this is an relevance to a new organization working with called regional, I've seen that through the lens of local climate action and local climate action plans for counties in rural communities, there's just a tremendous opportunity there to connect local policy around climate change to land stewardship and food and water issues and would really value more social science research and how that can be done more effectively. Thank you for the opportunity had her really value the work in this community and everyone on the call. Thank you.

>> Thank you. Thank you for those comments. And next we have Max. Good afternoon or good evening, everybody. I am Max Johansson. I'm with NOVA nutrients. Nova nutrients based in the Bay Area that up cycles carbon dioxide into protein and use fermentation hydrogen is clean is relatively expensive. And we need systemic investment to move those two poles closer to each other. We need to accelerate research in the area of green hydrogen production. Unfortunately, I am of the mind that it won't become cheap to -- and that's why I think that it's the duty of all responsible scientists and people who care about the environment to advocate for a price on carbon at least twice as high as the current policy targets and to affect the systemization of that price per carbon or enter into multinational perpetrating market not unlike the EU. I think that not only did it will accelerate a transition away from fossil fuels to clean energy and will create new jobs and open up many new economic possibilities. I think that some of the previous speakers said that we are sort of in the last minute of the 11th hour right now. And I think that bold action is required to affect these policy goals to transition us to sustainable energy. As much as I love wind and solar, there are certain consoles of visibility were as green hydrogen production what's cost-effective could conceivably take place anywhere relatively little waste and effectively and for feedstuff. That's really all I had to say. I will put some of my bullet points up in the chat and thank you so much for allowing me this time to speak.

>> Thank you so much for that. Our next speaker is Doctor Marianne from Cornell University.

>> Thank you, Allison and thank you for allowing me to speak today. I'm on the faculty the natural resources and I work with Cornell Cooperative Extension is a land-grant school in New York State. So my remarks today are about plant-rich diet as a means to reduce food emissions and improve people's health as well as about food waste. In working with Cornell Cooperative extension across the state, I have found both rural areas like the Adirondack region and cities face similar issues of lack of access to healthy plant rich foods whereas many people are familiar with urban food deserts, people in rural areas may have to drive miles to buy food and generally with an episodic gas station convenience store with

fewer no healthy options. Further, people including low income residents on federal nutrition programs may know little about plant rich foods and how to prepare them. So I propose research on two areas related to plant rich diet and first is the various you accessing healthy diets including barriers related to physical availability of plant rich foods and to people's awareness of the benefits and knowledge of how to prepare such foods. And second, to look at innovative policies and practices that incentivize and otherwise work to enable access to healthy plant rich foods. Such research conducted in rural and urban low income communities addresses concerns about diversity, equity, and inclusion and working with Cooperative extension can also help to ensure use inspired research. For example, I reached out to a cooperative extension educator in preparation for my remarks and she asked me to include in my comments today research into the effectiveness of youth education related to protist consumption, for example, preparation and taste testing. A focus on policies such as plant-rich procurement programs in schools, hospitals, and other institutions and subsidies for livestock farmers converting grains and produce. Or subsidies for that matter for alternatives to meat and dairy. Plus the impact of innovative food access programs such as farmers markets and CSA's will address socioeconomic science integration. Finally and importantly, I want to mention research on reducing food waste as a climate solution. I have found through volunteering with a food safety massive food waste and dining and student residences, probably especially the off-campus residents and on-campus residents but and dining there's at least some food waste diversion. So how to organize food recovery programs given health regulations and sorting of plant food from other plate ways to enable composting by generation as animal feed and promote dining food left at the end of the day with food litigator apps are all needed in research areas. So thank you.

>> Thank you so much. I am going to turn it over now to Stephen.

>> So thank you to all of the speakers for their points. We like to offer an opportunity now for anyone who is participating in this session to raise their hands and provide comments. We are in a session that is around the theme of food and global change in all of these sessions where we recognize that global change issues or crosscutting and interconnected and we averted experience that through the comments we received today. So we welcome comments from anyone on any of these topics related to global change on food or other topics as well. If you are interested in providing comments, I encourage you to go to the three dots more menu on the bottom of your screen and raise your hand and we will then have the opportunity to pull you up for audio only contributions to our session. If there's anyone interested in providing additional comments, now is your opportunity to do so. Does anybody want to add to what we've heard today? I am not at this point seeing any hands Amanda, are you -- all right. So we want to thank you for joining us today and, Nikki, if you can pull up the next slide -- I will quickly go over next steps. We will follow up with an email to all registrants with a couple of more opportunities evaluation as well is a call for input to you -- to USGCRP so those are interested in written comments, this is an opportunity and a structured way to provide some of those written comments as well. We will be -- we will also be hosting on the event page where you originally found information on this session and the outputs from this session a video recording and transcript of the session will be available there. And then finally as we noted, all of the inputs from these listening sessions will be available to USGCRP and the advisory committee to inform their work going forward. So with that, I'd like to invite Mike to come back on and provide closing remarks were USGCRP and then Allison.

>> Thank you very much on behalf of the U.S. global research change program 13 agencies and many federal employees we sincerely appreciate the time and the input I was pleased with what we heard

today, very thoughtful and very prepared and very insightful comments. We have notes of them. We will capture the comments in the chat here and this will go back to USGCRP for consideration as we develop a strategic plan and I encourage you to take a look at the perspectives and I have a link to that in the chat is a high level outline where we're starting and then look for a full draft of the plan for public comment in the middle of 2022. We are very much appreciative of your time and of the input. Thank you so much and we look forward to putting our plan we will all be proud of. Thanks so much.

>> And Alison, on behalf of the committee.

>> On behalf of the committee I would like to thank everyone for your active participation and contribution today and look forward to getting out more information as it becomes available.

>> Thank you appeared and just -- as a final parting comment, we have one more session on Wednesday evening from 5:00 to 6:30 p.m. Eastern time. We have a session on transportation and infrastructure, and we welcome your participation and that and we will commit to provide comment on any of the topics that have not been addressed or where you see additional attention that needs to be paid to those topics, whether they are specifically ran transportation infrastructure or other subjects. So thank you for joining us today. Hope you will join us on Wednesday and thank you for your interest on USGCRP and global change addressing global change issues.

>> Thank you.