

USGCRP Listening Session Live Transcript

Session Theme: Global Change and Health

Session Date: 15 November 2021

>> Greeting, everyone. Welcome to the USGCRP listening session. My name is Sara, from the University of Washington. And on behalf of the National academies committee to advise the U.S. global change research program, also known as the USGCRP. I welcome you to this listening session on global change Issues. Where a specific focus on health. Related challenges and opportunities. Through this session, and others in the 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 to implementation of its work over the coming decade. In these sessions, we are welcoming many people from across the spectrum of users. And researchers. Including staff from the USGCRP and agencies that comprise the USGCRP. Members of the national academies committee to advice the USGCRP. Of which I am a member. And all of you, users and researcher whose are engaged in building on and applying the types of knowledge and tools that the USGCRP is charged with developing and supporting. So we'll start with our agenda. In the next slide. In today's session, we have a series of speaker whose will provide remarks all of whom expressed interest in contributing when registered for this 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 advice the USGCRP are attending in listening mode. Next slide. To start I would like to acknowledge, I think we are going to do the next slide here. To start I would like to acknowledge that while today we are gathered virtually, the national academies is physically housed on the traditional lawn of the Nacotchtank Peoples 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 Peoples and nations and this land and we thank them for their resilience in protecting this land and aspire to uphold our responsibilities to their example. We acknowledge that our understanding of health, and global change Issues are closely related to and informed by Indigenous knowledge and experience. I am joining from Seattle. Including I and others are looking far ward to this to connect with researcher whose are using and applying global change information in our work. As part of our regular meetings throughout the year, we provide this and other opportunities to engage with and hear from broad audiences to inform their -- this important work of theirs. The goal of this series of listening sessions including to gather, useful information actionable input for USGCRP for implement face of its work. To make connections and expand the group of researchers and users who are directly engaged with the USGCRP and its work. Recognize connections across researchers users and themes of USGCRP. And inform future potential engagement mechanisms and opportunities including forms approaches and participants for such engagements. You do not need to be familiar with USGCRP to provide input. We are specifically seeking to connect with a broader audience in these sessions. If you are unfamiliar with USGCRP, we hope you had a chance to view the introduction video on our event pages before the session. Or we encourage you to view it afterwards. In preparing for these listening sessions, USGCRP requested input and insights on the following themes to inform, the implementation of its strategic priorities and activities. Diversity, equity, and inclusion. Which action should be prioritized to fully incorporate these values in Research, community engagement, and work force development. How do we implement them? Advancing science. What are the priority gaps in foundational science or methods that require enhanced long term investments. Use inspired research? How do we ensure that USGCRP science and products are better driven by -- and connected to users including for example improved use of consultation, translation, dissemination, informing client services, socioeconomic sciences integration. Socioeconomic integration. What are the priorities for integrating socioeconomic sciences into our program and to inform critical decisions?

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Particularly helpful feedback might include ideas on emerging large scale scientific questions related to global change. The USGCRP is developing its next strategic plan, and expects to release a draft prospectus with a public comment opportunity before the end of 2021. While these listening sessions may help inform the development or implementation of this plan, individual feedback on the per se should be submitted to the mechanism. An inclusive environment, where all parties participate fully in an atmosphere that is free of harassment, and discrimination, based on any identity based factors. Please report misconduct immediately to Steven whose email is at the bottom of this slide. You will turn it over to Steven for a few housekeeping details.

>> If you would go to the next slide, please. So today we are using two different platforms for a couple of ways of having you engage and give input to USGCRP. First of all, we are all joined together via zoom. For the video, and audio portions of this session. And we encourage you to view and seek the in speaker view, we will have a Series that will be following this introduction, and that's the best mode for seeing them. In addition we would like people to find you if they wish to, and encourage you to change your name, the name on your screen. Which I see I have not yet. We are also providing a live close captioning of this event. If you wish to display that closed captioning, please choose the live transcript option in the bottom of your screen. And then finally, if you need assistance with zoom, please if you are on the platform and having trouble using it, please send a chat to one of the hosts, myself, or Rob Greenway, or send an email to Rob Greenway, at Nas.edu. The next slide, please. In addition, we will be using slide-O for texting inputs for the sessions. And so we encourage you to join us. And there are a couple of different ways to do that, you can -- if you are using a mobile device, you can use the Q.R. code that's shown on the screen. You can go to slide O.com. And then enter this event code. And then we will also put a link in the chat so that you can join. Even though it is Q.Z. as we are asking you to share. The advisory committee are in listening mode here, so we are not -- going to be answering specific questions that are raised. Within the question and answer mode, and you will have up to 300 characters per entry, was if you have additional comments there's opportunities to reply either to your own thread, or a thread that somebody else has started. Again, those contributions are up to 300 characters. And we encourage you to -- this will be part of the record for these sessions. We will not be producing a report, but the advisory committee as to the recording and also the outputs of this. So we encourage you to join with us in all of these different modes. And finally, whatever way you were contributing, next slide, please. And as noted, these are the outputs of this session are part of our public record for this event. And so please be aware as you are participating in this -- in these sessions that the event will be recorded and the outputs of our engagement platform will also be included in the public access file for this. So with that, I'd like to invite Mike Cooper Burg to give a welcome.

>> Hello, and good afternoon. Steven and Sara thank you so much for your welcome, and opening comments. My name is Mike Kuperberg, I am the executive director of the U.S. global exchange research program. USGCRP as we call it, 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 that as our board of directors. I am here today representing those 13 agencies. And we want you to know that we are serious about our legislative mandate. Which tells us to assist the nation and the world to understand, assess, predict, and respond to human induced natural processes of global change. On behalf of USGCRP, thank you for your interest, and for your expertise. Considered as we draft and implement a ten year strategic plan a new ten year strategic plan. Knicks to the staff for the national academies there are a number of federal agency representatives and folks with the national

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coordination office on the line today. Those notes will inform our discussions and writing for the new plan.

>> Please watch for these opportunities to comment both on the prospectus and on the draft plan. Finally, on behalf of USGCRP, our sincere thanks to you, for taking the time to speak with us today. To the committee to advise USGCRP, and the staff of the national academies for organizing these sessions. Specifically, Sara Kuran, Amanda stout. We appreciate it. My sincere thanks from the national coordination office, for their roles in making this possible. We very much look forward to your comments and input and we will be watching listening carefully, thank you.

>> Thank you, Mike. This is great. So I would now like to -- we would like to hear from you and really thank you all for making time today to join us. And to participate. I think what we would like to do now is turn to our first speaker. Caleb dresser from the Beth Israel medical center. Caleb, I think you can unmute yourself now.

>> Hello, am I audible?

>> You are, thank you.

>> Thank you for having all of us here today to provide our perspectives. I appreciate your commitment to soliciting a diverse array of viewpoints for these sessions. I am an emergency physician, and much of this is population health implications of climate related disasters. There are two big pictures suggestions I would like to share with this group. First, in terms of communication around this Issue, I think it is important to make health a more visible Issue in the discussion of global change. For organizations without specialists in climate change. Would be really helpful particularly as we talk about adaptation plans at all levels of society. So I will pause there. Thank you for all of your efforts to address the global change Issues we are facing. And your work to highlight human health in the forthcoming plan. Your work is essential, I look forward to seeing you.

>> Thank you. That was help. I'd now like to turn to teddy Potter from the University of Minnesota.

>> Thank you for the invitation to speak agent the health of the USGCRP listening session. I am at thankful to the 13 agencies at the collaboration. For your on going commitment to quality science, to protect the health of our nations citizens. My name is Dr. Teddy Potter and I am director of health at the University of Minnesota school of nursing. I also chair the American academy of nursing expert panel on the environment and public health, and I am a member of the steering committee for the planetary health alliance at Harvard. I love, work, and study. Today I bring concerns from the global plantar health community especially underrepresented communities including our youth. We are witnessing the failure of many national and international leaders to make the necessary changes to keep global warming below 1.5 degrees Celsius.

>> I define health with a planetary health lense. It is a solutions oriented trance disciplinary field, and social movement. Focused on analyzing and addressing the impacts of human disruptions to earth's natural systems on human health, and all life on earth. In September, the declaration on plan story health was released by the planetary health alliance. The declaration, written by many global experts from all sectors states we need a fundamental shift in how we live on earth, that we are calling the great transition. Therefore it is pertinent for the discussion today. Inner agency collaboration and research must engage with and initiate trance disciplinary efforts to inform, and operationalize planetary health

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focus research, policy, and practice. And that's what you are doing today. But note this addition in the declaration, within an emphasis on solution focused inquiry and applications. That are inclusive of always knowing and backgrounds. Research must promote open science, principles and practices. Elevate code design, and parties pa story based research with communities, and better communication methods and collaborations to increase public and political awareness about planetary health. In closing I want to emphasis, that every human system, must change. If we are to solve the planetary health crisis before us. Previously research has primarily focused on the nature and urgency of the problem. We need to pivot and ensure that our national programs provide science base solutions that individuals, families, and communities can take to protect their health, and health of all life on the planet. Thank you.

>> Thank you. I would like to -- and thank you for staying within the timeframe. I would like to invite Rebecca Rare from echo America to join us. Thank you.

>> Great, thank you for hosting these sessions and for the opportunity to provide comment. I am the director of climate for health at echo America. I will talk about three topics, mental health impacts of climate change, engaging in environmental justice through paid opportunities and focusing on solutions. First, we just released the addition of mental health and our changing climate. The impact of a changing climate on mental health stem from acute events and longer term change, individual mental health impacts from climate field disasters include trauma and shock, Ptsd and anxiety and depression. Longer term climate change can cause equally significant mental health impacts. For example, air pollution has been linked to increase anxiety. Lower happiness and other negative well being impacts. Concern about climate change coupled with worry about the future, can lead to fear, anger, feeling of powerlessness, exhaustion, stress, and sadness. Referred to as eco anxiety and climate anxiety. While the destructive impacts of climate change will be felt by everyone, as with other impacts the burdens of the mental health impacts will fall heavily on those oppressed by his tore stick present day political power dynamics. Importantly, climate solutions build mental health resiliency. Mitigating temperaturized better air quality and access to nature all bolster physical mental and community health. The report devils into levels of engagement and responses from providers, local governments, communities and individuals. USGCRP can use its convening power and cross agency reach and engagement to incorporate information about mental health and well being into climate research and solutions. Please make sure to engage with the substance abuse and mental health services administration, and the national institutes of mental health. Mental health did get one mention in the needs and opportunities to 2031 report, and I hope that grows in the plan. My second point about environmental justice is, we need to start valuing community wisdom and qualitative data the same way we value quantitative data. The needs and opportunities report does talk about community driven solutions that address immediate vulnerables while building resilience and protecting livelihoods. This is a great start, and can be further details and framed through grant requirements for community engagement. And also proper training for scientists engaging with communities. Going further than community based parties pa story research, to make community owns and managed research models the gold standard. Pay for community input and leadership. Folks on the ground and communities should be paid for their property, the same way scientists and researchers are. And then finally, solutions. The member agencies have done a comprehensive job documenting the problem of climate change, and impacts to the environment, and our health. Majorities of Americans are now concerned about climate change. But they need support to act. And my work, the question I get most often is not,

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what is climate change, where is it happening does it impact me. It is what can I do about it. I strongly recommend the USGCRP help answer that question. I applaud the report for the focus of interactions of multiple systems and on reducing inequities which are important anchors. The risk framing approach to identify research priorities is also a step in the right direction, as long as those priorities include studying solutions and support engagement and action. What we need is solution science. Studying what works. Lean transportation, more green space, youth leadership, and how to scale it. Taking an all of government approach to climate change because that's what solutions will take to. All of us. Thank you.

>> Thank you so much. Now I would like to turn to V.J. from the natural resources resource council.

>> Thank you. Hi there, good afternoon. I want to thank you USGCRP for organizing this session. I am a former Epa staffer so I am very grateful for your work. I now work as a climate and health scientists. Of course climate change is here now, and USGCRP should enhance its focus on supporting interagency efforts to investigate climate sensitive health problems and their associated financial costs on individuals, families, employers, insurers and the federal government itself through Medicaid and Medicare. We know from the science that burning fossil fuels is contributing to extremes and each of these climate problems is causing a range of premature deaths, illnesses, and costly injuries. These worsening climate hazards have very real consequences both in people's pain and suffering and in the associated financial costs that are largely absent from our public federal accounting of climate related damages. Moreover, these costs pose a wide array of impacts especially on vulnerable groups, least able to access affordable medical insurance. As noted in Nca4, climate events are expected to increase in duration, and scope in the future. In fact, Nca4 of course spoke to hundreds and billions of dollars in economic tie to the climate problem. No attracts the damaging inflicting by these disasters but near NCA nor the billion dollar disaster come ped Yum devils into any detail on the health role of those costs. NOAA's focus is on things that it can count, property damage, infrastructure losses and crop failures. Things that are insured. But the health and health cost data is an important gap for USGCRP to try to help nil. Especially because public polling indicates that more than a third of American adults currently experiencing medical hardship, that is an inability to afford necessary prescribed medical care. This science indicates that delaying or completely foregoing necessary care as millions of Americans are doing right now, can make them even more vulnerable to the health problems from climate stress res. The projected future burden on health and health related economic Coteses will be enormous if climate pollution continues unabated and communities are not prepared. But those costs are not only a future concern, they are right here right now. And burdening American families. I led a 2019 peer reviewed analysis demonstrating \$10 billion in health costs related to climate sensitive events. From nearly 1,000 premature deaths, 20,000 hospitalizations, and approaching 18,000 emergency department visits, all associated with just a sample of climate sensitive health problem in a single year across the United States. These are the damages that Americans are paying for right now, but unfortunately, efforts like the Nca are not shedded needed light on this Issue. Our study identified the Medicare and Medicaid patients are the most vulnerable neighbors as the disproportionate payers of the illness costs identified in our study. But we lacked visibility into these costs in terms of who is paying them right now. Individuals of families are being stressed worsened by the climate crisis but we lack needed visibility. Now as the time for USGCRP to step up and coordinate federal efforts to better understand the terrible public health and financial burden of climate change. This is a key equity problem that has gone unmentioned in major federal reports. USGCRP should also work to establish a

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federal integrated data tracking system that can help the public and researchers to better grasp the current and future burden of climate change and public health. Right now we lack real time visibility in that problem, we are relying on journalists and reports in order to understand what is happening across the country. In 2021, we certainly should be relying on Cdc, NOAA and Epa to support more comprehensive analysis of the health impacts and cost of climate change. Our research indicates that actions to achieve climate pollution reductions and bolster preparedness can help our country to avoid and reduce tens or hundreds of billions of dollars in future health cost by keeping people out of harm's way. But we need USGCRP to facilitate more federal Act to make those costs of inaction and benefits of strong policies even more clear through policy makers. Thank you.

>> Thank you Vijay. Now I would like to welcome Dan Vukelich.

>> Thank you very much. I am president of the association of medical waste reprocessors. This is our first opportunity to speak or introduce our Issue, or Issues of concern to the USGCRP. So thank you. I hope I will stay on topic, and certainly take advantage of the opportunities outlined here as future perspective reports are put out I will submit comments. My members are FDA regulated firms that reprocess or remanufacture devices that have been labeled for single use by their original manufacturer. So that entails collection of device that has been used in America hospitals, cleaning, disinfection, testing, and sending them back. But we do so meeting the same standards that would be required as if these devices were sold new. We serve most hospitals in America. We serve all of the U.S. news and world reports honor roll hospitals. We serve immediately all the O.D. facilities. We serve nearly every private and public health integrated network. The institution we do not serve the United States veterans health administration, and we think this is a huge lost opportunity for the government to be taking care of our veterans by throwing away assets after one use. In our experience, and what has happened of late with Covid, is that the U.S. healthcare system is addicted to disposing medical equipment. Unlike most industrialized nations we have nearly twice the global greenhouse gas impact from the American healthcare sector, as the rest of the industrialized world. And this was data that was available preCovid. And everybody is now intimately aware of how many syringes, masks, gloves are being thrown away which means they are being incinerated. Unfortunately, in a field where we take the mantra to do no harm, health care is doing exactly that. In our zealous treatment of patients in front of us, under the guise of infection control, we are just throwing away in America. And that waste needs to be incinerated. The incineration of all this medical waste literally causes harm to our patient populations with as the speakers have pointed out. Increased asthma, cancer, because we are putting toxins into the environment. The healthcare sector is responsible for 4.4 to 4.6% of worldwide greenhouse gas emissions. According to data published in the journal health affairs last December. That's twice the aviation industry. How irresponsible of us who are in charge of healthcare, for our patience, to be making our own patient population sicker. Not just by emitting greenhouse gases but by literally burning the trash we are creating that makes our population sicker. Of the emissions that healthcare is creating, over 80% are coming from the supply chain. Or scope three. And so we believe that research that focusing in particular on ways that we can solve problems with the healthcare supply chain by encouraging reuse, reusability, or reprocessing, we think would be advantageous for our American healthcare purchasers. We have started by conducting life cycle assessments of our products compared to disposable. We have begun with one device, a cardiac catheter. These are threaded into the hotter to make a diagnostic image. They range between \$500 to 2,500-dollar a piece. But on 13 of 16 environmental measures the remanufacturer or reprocess the device was preferable in a life cycle than

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just throwing it away and using a disposable version. And just as safe defective as using a brand new device. We are also moving forward in the rest of the world. NHS in England did not sort of take a break these last four years. They are pressing forward in pushing for a net 0 healthcare system, and so they are getting behind efforts like medical device reprocessing and remanufacturing so we think collaboration with what other countries are doing to help elevate and bring attention to these would be beneficial. So lastly, looking at the things we think would be beneficial to help clean up the toxic supply chain we have, is more life cycle assessments to demonstrate two purchasers the preferability of reusable or reprocessed equipment verses the disposable culture. More research to underscore that perhaps just slapping single use on everything isn't always needed to protect patient's safety, and so actually adequately informing our health care practitioners as to what needs to be disposable and whatnot, and we would also like to see regulatory oversight over manufacture's forced use to put kill chips or software into their guises to make sure they stop working after one use. Thank you for this opportunity, I appreciate it.

>> Thank you, Dan. Now I'd like to turn to from the Georgetown University. GutoGalvao.

>> Thank you for this. I have had the foundation in Brazil, a researcher there. In that the point I want to make here is more looking to the global health community, and how the global health community can be engaged in this very important initiative on the USGCRP. So all of the materials from these initiatives have been used worldwide in many different places. So it is different use. I thank Dr. Potter and heir, because they are -- I will keep all of the part that have to do with international part of that. So my first point was about planetary health as an emerging area. That's incorporated not only human health, but also the well being of the earth all together. And that as was said here before, there are a ver important momentum now on planetary health. Score that's an important point not just to the U.S. but globally, and that will help to look into solutions for the global change we are seeing happening now. The second point is about the specific compilations. But I want to make a point on the people that are in the home Les situations, are the most vulnerable people for climate change. And that particular situations, where it is everywhere, in the world we will advance not only social justice but equity and inclusion. And also give a focus and a very practical point for the intersector action particular problems. So and finally, it is about the materials and the documents and the USGCRP are providing us and have been used for evidence in the research and teaching, and I think -- our people that are using this, educationally will improve the information, and also will promote the interchange between different realities like I do that all the time, and that maybe increase the basis for the case for global change and how important and how it is to act on this many crisis and health crisis we are having. Now in the world. So if you use the approach of open science, and have a very important experience of that, we can accelerate and we can also promote not only the global change ideas and the actions out of the 13 very important agents that are doing this every here in the U.S., but maybe engages in other agents and other people around the world. So thank you for this opportunity.

>> Thank you very much. And now I'd like to invite Max Keefeer from the Cdc and Niosh.

>> Hello. Thank you for the opportunity to speak. And my name is Max Kiefer. I have retired from the Cdc, but I am here trying to take advantage of this opportunity and thank you again to advocate for research on occupational safety and health. And give a pitch for ensuring that the new member occupational health is a form of public health. Workers are often the tip of the spear, and are certainly the most at risk to the health impacts of climate change. I will give you some examples about from

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primary impacts as well as secondary impacts. Of these vulnerable populations we call workers. First, an example would be wild land firefighters. We know that fire extremes are occurring more rapidly at a greater strength. And that the fire season is increased. By approximately 80 days over the last 30 years. And we also know that firefighters have a lung deficit measurable after the end of the fire season. And then have a recovery period before the next fire season starts. What we don't know is what the impact of an additional 80 to 100 days of firefighter has on their health. So those are questions that need to be answered. We also know that outdoor workers are more at risk for lyme disease for example. As the range and the cycles of those increases what will be the impact of that. For example, valley fever is now endemic in the state of Washington. And certainly workers whether it is construction, solar panels etc. are very much at risk. On the topic of diseases we are using the use of pesticides in areas where they were not used before. I think surveillance is key to all of this. From an activation standpoint, and from intervention effectiveness. It is something we can measure. It will take a lot of work to design those types of surveillance systems and you have to be knowledge able to provide it. But there are some agencies that are equipped to do that. For example, in the centers for disease control, the national institutes for occupational health, certainly has the talent and researchers necessary to do that kind of work. With the secondary response to climate change, that I referred to earlier, I am talking about the safety and health impacts of our response to climate change, whether it is carbon capture, construction, implementation, and maintenance of wind towers. People have to go up to them. They have to climb up to the tunnels. The towers. And go into all sorts of environments that we don't have much data on. So one organization that could help with that is a national energy laboratory, in Denver Colorado. An organization that can do that type of research as well as ensuring that they are considering worker's safety and health impacts as they are conducting. Their research on the new designs to address climate change. Finally, I think health communications are important. As I am sure we all know, in communicating the impacts of the climate change on the public health, in my case, my interest it is workers. I want the turn now to Carl mayor. Thank you for the chance to share my thoughts here. I have a disciplinary action in psychology and behavior medicine. So I have been applying that developing curriculum that integrated the social sciences. So my scholarship includes thinking around environmental change. And some of this may help address each of the four themes identified for the listening sessions. But mostly I want to suggest a conceptual frame work that fits with the consensus report that I am sure you are familiar with now. And that recommendation is integrated reframing approach. And that recommendation responds to the need, of course, to have greater coordination and communication about complex interactions. And that's between physical and human systems, so on that note, I think it is critical to include bio diversity, since that is impacted by many of the same drivers of climate change. And it is probably really a more immediate threat to the population given the implications really for zoonotic diseases like Covid and our food web. And also to echo some prior speakers this should be framed around communities. And so kind of community base parties pa story research should be reinforced. So this fits within the main suggestion of how to integrate across these problems and risks. And complexity, of course, makes the job of global change reporting difficult. But we also know that it is important to have a simple way to represent that complexity. So that the researchers and also consumers can talk about it. And collaborate and organize what is known, and also identify what is not known. So many of you may be familiar with the bio psycho social model and that for over 40 years it has helped shape a more complete understanding of health and disease that really integrates biological factors with behavior, and social factors. And so that basic concept has been extended to an ecological framework, where we can look at these bio physical, psychological, and social domains at multiple

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levels. From the micro level factors like cells in genes all the way the most distant influences like climate and economic forces. So think about the bio social concept, but Strat tied according to different levels of scale and system complexity. And all those domains and levels interact as one ecological system. Now, if that sounds confusing, it is actually pretty simply illustrated in a grid format. And that provides that can hem organize thinking and research findings, and really there is a need for that. Because just today in PubMed if you search climate change, you will find over 60,000 articles. And over 400,000 articles from the web of science core collection. So without some structure, it is hard to everybody know what questions are being addressed in all that research. Much less really drawing any conclusions from it. So one basic way this frame work could advance your science is that it can guide the infrastructure for data, and information sharing. And I will include an example in my text summary points on slide oO in a moment. Where I have started pilot work on what eventually will be a data base where artificial intelligence will be used to help classify all the climate change literature into that frame work. And I think the global change reporting program can use a structure for organizing and presenting consensus finding. And they can also help guide gap analysis of the research. And I think inherently, it can also support communication, and collaboration across really all the disciplines and the stakeholders. Who typically don't have as much dialog with one another. And also finally point out that I recently used this to map out Issues of equity across the different areas of the frame work. So if I may one final point, being a social scientist for the theme of integrating social economic sciences that was listed as one of is the areas, I will simply say that refer social sciences because it is a little more inclusive with fields like psychology and sociology. So with that I appreciate your consideration, and be happy to discuss more at any point.

>> Thank you, Carl. As a sociologies I agree. I would like to now invite Elizabeth.

>> Yes, hello. I am with the U.S. agency for international development, and I have a bit more of a brief question but not one that's more simple to answer. I would be very interested in seeing research that's done focusing on financing for climate change. And what are some structures this are underutilized but could be used in the future. For this purpose, but with domestically and internationally. And also what are some barriers. Especially in that case looking for private sector engagement. What are opportunities that are sometimes successful, and the factors that lead to that success, and then also what are the barriers. What is standing in the way of different potential partners joining together to take action. To leverage money from the private sector on adaptation. And alternative financing mechanisms such as loan guarantees should also be considered as well as debt for nature swaps. And grants. Research looking at which mix of those is most appropriate in different contexts and what the potentials are. And what the down sides of those would be help NFL trying to frame the work moving forward. Especially on adaptation. Thank you.

>> Thank you, Elizabeth. Appreciate that. Now we'd like to turn to Nathan Patterson from Carlton college. I believe. I guess he is having trouble using his Mike. Shall we go to the next person? I am just waiting for my -- I am going to turn the Mike over to Donald Ed Monson from Columbia. I have a Don here. Would you like -- I guess we are out of speakers? I will turn to Steven or Mike to help me out here. Where are we? Great. Well, Sara, thank you for walking us through that. We appreciate the input that people have given. We have five sessions over the course of this set of listening sessions. On various themes, but recognizing that many of these teems are cross cutting, we are also getting inputs from people who are engaged with for instance this theme of health, in some of our other sessions. So we are welcoming these inputs into future ones as well. Could you bring on the slides? The -- our next

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steps for go to the next slide please. The next steps for this session, I mean for this series of listening sessions are that we will be following up with everybody who has registered for this session. And that follow up email will provide links to a couple of questionnaires that we'd like you to engage with. First of all, an evaluation for this session, and also we have a broader call for input. So as I said at the beginning, we have a couple of different modes for you to engage with USGCRP in this listening session activity. And so one of those modes is this questionnaire. So please, pay attention, look out for a follow up email from us. And we appreciate your contributions to both of those questionnaires and evaluations. We will also be posting materials from these listening sessions on the event page, that if you -- the easiest way to find those event pages is through the national academies. And we have also included it here in the chat. But if your search under the board on atmospheric sciences and climate, under the events you can find all of the sessions after the sessions the materials will be available on the individual event sessions. All of the contributions that were provided today and at other sessions will be available to USGCRP and the advisory committee. Merely to inform all the work they are doing going forward. Next slide please. So today is the second of five sessions. We invite you to engage with us in the three additional sessions that are coming up. On Thursday, November 18th, this week, we have a next session on energy. And global change. And the first full week of desks we have two additional sessions one on food, and the other on transportation and infrastructure. We invite you to come and register and anticipate in all of these events. And we look forward to all of the contributions that you provide. Sara, do you have a final thought from the committee before we close out today's session?

>> No, thank you. It's been an honor to be here and listen in, so thank you for your contributions.

>> Mike?

>> Let me just add the same thing. Fascinating conversations, we very much appreciate what you have to say.

>> Thank you.

>> All right, thank you.