Megan H.: My name is Megan Haidet and I work at the National Institute of Food and Agriculture. I would like to first thank you all for coming out today to provide comment. We are very interested in what you have to say. We want to know your top priorities in food, in agricultural research, education, and extension. And, what are the most promising opportunities for advancement of food and agricultural sciences.

[00:00:30] We have an agenda, I hope all of you picked up a copy outside, and I'll let you know that that is our guide for the day. Today is really about hearing from you, so we've given each speaker five to ten minutes to talk, and if we run a little ahead, that's okay. We'll just move up speakers. This is our guide. This is our fourth listening session. Some people may not show up, so we'll [00:01:00] skip head. We also have flexibility at the end of our program for folks that are not on the schedule that would like to provide comment.

So, we have a great group of participants today. A really diverse group, and I just wanted to make sure that everyone respects the speaker that's up here. So please silence your phones, and if you're having side [00:01:30] conversations, please take them out of the room. We will have a morning break. As you've seen, we have some refreshments outside, please help yourself. The bathrooms are around the corner, back out towards the lobby. When you're speaking, please stay at the podium. This session is being webcast so folks can view this online, and we want to make sure that they see the speaker. Also, if there is a little bit of extra time after [00:02:00] your presentation, we will accept questions. So if you have a question for the speaker, please come up to this mic to the right of the stage, and introduce yourself.

Additionally, we'd like to take a photo of the entire group at our morning break, so please don't disappear too quickly. I think that is about it for our morning. [00:02:30] So, I would like to start with a video welcome from the NIFA director, Dr. Sonny Ramaswamy.

Sonny Ramaswamy: Hello, my name is Sonny Ramaswamy, I'm the director of the National Institute of Food and Agriculture. I want to take this opportunity to welcome you to what we refer to as NIFA Listens. This is an opportunity for you [00:03:00] to be personally involved in telling us where we need to be investing our resources, in regards to the research, extension, and teaching endeavors that NIFA supports, and the work that you undertake at your institutions. We are offering this opportunity for in person input, and if it turns out that you've got additional thoughts that you want to share with us, [00:03:30] you can certainly go to our website, NIFA.USDA.gov/NIFAlistens. Again NIFA.USDA.gov/NIFAlistens, and you have the opportunity to provide additional input through the first of December of 2017.

I can guarantee you that all of this input that is going to be provided by you, in person or through our website, I encourage you to also talk to your colleagues that have not participated here, and tell them to [00:04:00] also provide input.

We're going to take all this input, and analyze the information that's been provided to us, and incorporate that into the priorities that we're going to be investing in over the next many, many years.

I want to thank you for participating in this very important effort, and look forward to engaging with you now, and in future as well. Thank you very much.

Dr. Qureshi: [00:04:30] Well good morning, my name is Muquarrab Qureshi, and I'm the deputy director of one of the program institutes of National Institute of Food and Agriculture. It's my pleasure now, to introduce the next person who's going to welcome you all, Dr. Meryl Broussard. Dr. Broussard is the Associate Director of Programs of National Institute of Food and Agriculture. Dr. Broussard, [00:05:00] has extremely impressive credentials as a scientist, as an administrator, as a leader. In his capacity as a scientist, he is an aquaculture geneticist, nationally and internationally known for his contributions towards aquaculture genetics.

As the folklore goes, he joined USDA during the time of Abraham [00:05:30] Lincoln. Just kidding Dr. Broussard. He's a pioneer with USDA. He joined the early, early agency of when then became CSREES, Cooperative State Research Extension Education Service, and then eventually transformed into what we now have, National Institute of Food and Agriculture. In fact, the re-organization of CSREES in NIFA in [00:06:00] 2008 farm bills, was really predominantly his doing, as far as how we look as a NIFA entity today.

My memory with him, is that he started as the Director for the Animal Systems, and then the administrator for Plant and Animal Systems, when we combined them together. Then eventually, when NIFA was established, he moved up to be the Associate Director [00:06:30] of NIFA, which oversees all four program institutes. It's my real pleasure to invite Dr. Broussard to speak to us and give us some opening remarks, as well. This external NIFA Listens session is really his idea, his baby, so it's a pleasure to introduce Dr. Broussard, to welcome you.

Meryl Broussard: That such a kind remark from Dr. Qureshi. I remember I hired him, and [00:07:00] really appreciate that. Things were a lot simpler during the Lincoln Administration, I have to admit. It's a pleasure to be here with you. I've enjoyed listening to all of the sessions. So this is our fourth session, I've been listening online, and we are committed to listening to what you do. This is so important to us, in terms of ensuring the relevancy of our program. We have some of our university partners participating, key stakeholders, the end-users. Lots [00:07:30] of partners, it's been very exciting to listen to what you thinks important, and these regional listening sessions have been really important in terms of a regional flavor, and what's important in particular regions.

I want to thank our team for pulling this together. We've had a great team, and we really appreciate it in terms of logistics. We have plenty of opportunity to continue to listen to you, in terms of the formal input all the way up through December. Those who are not here, online listening, we still want your input.

[00:08:00] But really appreciate you being here, taking time out of your busy schedule.

Everything we do at NIFA is through a partnership. We have a $1.5 billion portfolio that we have oversight for, but we have about 350 people that work for the agency. A relatively small agency that's got to get the money, got to design programs. Again, this sort of activity really helps us in terms of ensuring the relevancy of the program.

We have briefed the Secretary's staff [00:08:30] about this. Last we, Sonny and I were in the Deputy Secretary's office last Friday. At the agency head meetings, we've talked about NIFA Listens, it's something we really thinks important. They really appreciate what we're doing and what you're doing in participating in this. I just want to thank you for being here. This is important. Dr. Qureshi going to have some follow up on what we're doing and how we'll use this information. But this, again, I guarantee you, our staff and a lot of our senior staff is here, we have a lot [00:09:00] of people listening online. We are going to pay attention to the comments you provide, all the comments, and we actually have an internal listening session. Part of that charge of listening, to our national program staff, and what they've heard from stakeholders through these session's

So really appreciate you being here. Thanks a million. I'm going to be here all day, and look forward to it. This is the first one I've participated in live. I've looked at all of them online. I've actually gone back to look at the replay of a lot of them, because it's pretty exciting. Last week, I was sitting in my office when [00:09:30] we did the Sacramento Listening session. I said, "Well, I'll put it on, but I've got some other things I'll be doing while I'm listening." But I couldn't do that. I had to stop the other stuff and just listen. Really appreciated what we're learning from these sessions.

Thanks a million, and thanks for being here.

Dr. Qureshi: Thank you Dr. Broussard, and before we go further, let me [00:10:00] ask all our NIFA colleagues to please stand up, so that people in the audience know who you are, and hopefully will have the opportunity to interact and socialize during the break time. Thank you. Thank you very much.

As I said earlier, NIFA really is an extra mural agency see of our mission area, which is called REE, Research [00:10:30] Education and Economics mission area. We collaborate with people like you, in the audience, people in land grant university system, a very diverse stakeholder partners, and conduct activities which are research, education, and extension, through these partnerships. We believe that scientific progress is only possible [00:11:00] through discoveries and innovation, which we make through research. We educate our next generation of scientists and workforce, as well as take all of the those discoveries to the end user, through our extension and outreach programs.

NIFA prioritizes its portfolios based on several guidance which we receive. The most important guidance, or our marching orders, so to speak, come from the Congress of the United States of America. [00:11:30] You're all familiar with the Farm Bill, which is essentially the footprint based on which our programmatic operations happen, along with things which are funded through what we call the appropriation process. Quite frequently, we also receive certain priorities from office of the President through executive orders, or office of Science and Technology Policy, or [00:12:00] directly from the White House.

We have started this process of listening to stakeholders by first talking to our internal program staff, which is our national program leaders. Yes, we are a federal agency, but I take pride in saying that our federal agency's really science based. All our national program leaders, program specialists, are [00:12:30] subject matter experts in their own right. They have served in academia. They have served in various science-based agencies and enterprises, businesses, operations, federal agencies. And bring a very unique skill set to what they think through their professional society meetings, through their program staff meetings, through their travels across the country, through their state liaison functions, what they think are important priorities, [00:13:00] which NIFA are to be addressing, through, as Dr. Broussard said, our $1.5 billion portfolio of research, extension, and education.

But also, in addition to the internal listening session, through what we call NIFA Science Week, which we had last year, or early this year, we are now reaching out to external stakeholders. As Dr. Broussard said, this is our fourth [00:13:30] external listening session. First one was in Kansas City, second one in Atlanta, third one was in Sacramento. I was there, I forgot, right? Now the fourth one, here. We're really getting some great ideas, and great input. As Dr. Broussard says, really some regional flavors, and that was the idea that we go around the country, and listen to our stakeholders, what they think is important for them.

After all [00:14:00] is said and done, we are essentially asking two very broad questions. And these are broad for a purpose, so that we are here to listen to everything, what you think is important for you. We are not passing any judgment, we are not asking you any questions, why you are saying that, we are simply here to listen to what you think are the top priorities. Secondly, what you think are the possible opportunities [00:14:30] for us to advance science through our stakeholder and partnership.

We would take all these priorities and feedback, and synthesize this input, and hopefully do several things. Primarily, your input would inform our budget process. That's really the bottom line, that when we write our budget proposal to the congress, we want to make sure that that budget proposal addresses the priorities [00:15:00] which you're going to guide us today, and the feedback which we have received so far. Combined with your feedback, and feedback from our program staff, we hope to craft our futuristic budget priorities, which are truly mission critical, which are important to you, to our stakeholder, and that we support all those efforts through our funding.

Stakeholder input is [00:15:30] in person, but in addition to in person, our electronic line would be open 'til December 1st. I encourage you all to go back and continue to input your ideas in this portal, because we will take all of these ideas ... whether we are gathering through internal listening sessions, or in personal listening sessions, or electronic mode ... we will take all these ideas and synthesize them into our priorities. [00:16:00] With that, I thank you and we look forward to a wonderful day. A wonderful session. But I must say this, that we could not have done this without one person, whose Megan Haditt. So I will hand over this program to Megan, to take it from here.

Megan H.: All right, well, a couple [00:16:30] more reminders. If you have a PowerPoint presentation that you have not sent ahead of time, you can meet with Kevin over there in the corner, and he will upload it and get it all set to be broadcast during your speaking time. I do have some reminders when you have five minutes, and two minutes left. We have a slide advancer. All of these things that you need should be up here [00:17:00] and ready to go. So, without further ado, I think we will go ahead and get started. Our first speaker is Christie Balch from Crossroads Community Food Network.

Christy B.: Good morning [00:17:30] everyone. I'm a former 4H kid from Wisconsin. I grew up on a farm, so I've had a long history with NIFA USDA, so thank you for this opportunity. I'm now the executive director of the Crossroads Community Food Network. We're a really small non-profit, based here in Maryland. We are building a healthier, more inclusive food system, in the Takoma/Langley Crossroads, which is a primarily immigrant, low income community, just outside of Washington DC.

At this [00:18:00] heart of this very integrated network of food growers, food makers, and food consumers that we work with, is our Crossroads Farmer's Market. That's where I'm headed right after this, today. We have a Wednesday farmer's market. That was where the origination of Double Dollars Programs came from. It matches, if families are spending federal nutrition benefits, we match those dollars with privately raised dollars, and that enables low income families to bring home more healthy [00:18:30] food, at the same time it supports local farmers. Three-quarters of our vendors at our farmers market, are immigrants themselves, so it's a really interesting farmer's market.

We also have a program that we help food entrepreneurs grow and build a legal food business. We work a lot of informal food entrepreneurs, and work to make them formalized. And then, we also just opened the Takoma Park-Silver Spring Community Kitchen, which is a shared use kitchen, allowing low-income food entrepreneurs to get a start [00:19:00] in the business, without having to spend a lot of money on their own brick and mortar.

We were founded in 2007 as this innovative farmer's market that did this Double Dollars Program. One of our founders, many of you probably know Gus Shoemacher, who passed away earlier this year. Over the last 10 seasons that we've been in operation, we've distributed over $450,000 in our incentive

dollars, to more than 1400 individuals, families, and seniors, who are low-income folks. [00:19:30] We are now a NIFA grantee in two of the NIFA programs. The Community Food Project Competitive Grant Program, that funds our community kitchen and supporting food entrepreneur class. Then also, we are now a Food Insecurity Nutrition Incentive Program grantee, also known as FINI. That is helping us really take our mission to a new level, which is really allowing us to do more outreach to SNAP customers in our area.

These two grants, [00:20:00] while I'm sure they're considered small programs at NIFA, are having a huge impact on our community, and other low-income communities across the country. I can't emphasize enough, how big of a difference those programs are making. And, we were well poised to take on our FINI project, because we were a participant in a larger AFRI grant, that wen to University of Wisconsin and the National Farmer's Market Coalition. It was called Farmer's Market Metrics, and it taught us and other markets across the country how to collect really rigorous [00:20:30] data that investigated the impacts that farmer's markets have on their communities.

Just to sum up, I just wanted to give some broader impacts on these grant programs. The Farmer's Market Coalition released a report about the FINI program, and just in the first year of the FINI program, which where there were 13 grantees that reached over 1,000 farmer's markets in 27 states. Those markets distributed over $3 million in incentives, and $5 million in SNAP, and that resulted [00:21:00] in approximately 16 to 32 million additional servings of fruits and vegetables for SNAP households. This also, importantly, translated to $14.3 million in economic activity for rural economies. That was just the start. This program continues to grow, and I see firsthand every day, these impacts.

Then, the Community Food Projects Grant, is really interesting. The way that it is evaluated is through this Indicators of Success Project, [00:21:30] and it shows the very diverse impacts of this grant. It could be increases in fruits and vegetables consumptions, building capacity within communities, job creation, training new farmers, all sorts of impacts. What's really important to me, is that these projects often take a very holistic view of the food system and are solving these systemic issues on a community level.

In conclusion, NIFA's work in community food systems is critically important, and taking this systems [00:22:00] view is essential. Crossroads Community Food Network is grateful for the FINI and CFP grant programs, and of the work that they allow us to do in this community. Thank you for your time.

Megan H.: Actually, Christie, we have a couple more minutes, if you would like to come back up here and take any questions. Are there any comments or questions [00:22:30] from the audience? If so, I invite you to come up to this mic. Okay. Thank you.

As you can see, we might be running ahead of schedule, that's how it goes. We didn't know if there would be 60 people or 160 people that wanted to come talk

today. I appreciate everyone remaining flexible with our agenda. [00:23:00] Next up, we have Richard Sellers, from the American Feed Industry Association.

Richard Sellers: Good morning. Couple of personal comments. It's good to see Dr. Broussard. We grew up two blocks from each other in Memphis, Tennessee. It's kind of amazing. Right behind Graceland, as a matter of fact.

[00:23:30] I'm a lobbyist. I've spent 26 years in the lobbying area for the American Feed Industry Association, and we are extremely staunch advocates for agriculture research funding. We have a foundation that funds some agriculture research, that's also NIFA funded at Virginia Tech, and we've got some specific things through our network of nutritionists, of which I'm a board certified nutritionist, that we want to share in this public comment period.

My name is Richard Sellers, and I'm Senior [00:24:00] Vice President for Public Policy and Education of the American Feed Industry Association, based in Arlington Virginia. AFI is the world's largest organization devoted exclusively to representing the business, legislative, and regulatory interests of the US animal food industry, and it's suppliers. AFI members include more than 670 domestic and international companies, such as livestock feed and pet food manufacturers, integrators, and pharmaceutical companies, ingredient suppliers, equipment manufacturers and supply [00:24:30] companies, that provide other products or services to feed manufacturers.

The feed industry plays a critical role in the production of healthy, wholesome meat, milk, fish, and eggs. And supports policies that uphold US food and feed safety, ensure the proper nutrition of animals, and protect the environment. More than 75% of the feed in the US is manufactured by AFI members. AFI members also manufacture approximately 70% of the countries non-grain [00:25:00] ingredients, including soybean meal, distillers co-products, vitamins, minerals, amino acids, yeast products, and other miscellaneous and special ingredients of which there are 900 approved by the Food and Drug Administration to use in animal feed.

A recent economic report, funded by AFI's foundation, the Institute for Feed Education and Research, found that our industry provides nearly one million jobs, and nearly $300 billion in sales, with 6,000 feed mills, and just over 500 pet food manufacturing [00:25:30] facilities. These sales amount includes pet food, which represents less than half of the sales number. So about $170 billion in feed sales across the United States.

We appreciate the opportunity to comment on these important issues for our members. Our members are engaged in animal agriculture sector, and support NIFI investment in commercial animal agriculture research, extension, education. Animal agriculture products provide a strong foundation of nutrition in the American [00:26:00] food supply, and is an industry that relies heavily on science and innovation to produce more food, more sustainably and more efficiently. AFI's top priority for NIFA is to invest in research, extension, and

education, which will help improve the sustainability and efficiency of commercial animal agriculture on a parody with plant agriculture.

A specific area where NIFA can support, is the training and development of qualified agriculture [00:26:30] workforce, through investment in education. It's been observed by our members, that there is a lack of qualified candidates to fill positions in our industry. Thus, AFI suggests more emphasis by NIFA on developing animal agriculture education.

With the growing advancements in science and technology, there is an observed knowledge and communication gap between the basics science and the application in animal agriculture. There is an obvious need for NIFA to increase funding [00:27:00] for extension programs in animal agriculture, to shrink this gap. We are aware that USDA and FDA received an appropriation from Congress to educate the public on bio-technology. We urge researchers and the public to view the new film, Food Evolution, to see one way of educating the public on new technologies. I think this is available both on Netflix and on Amazon.

With recent changes in regulation of antibiotic use [00:27:30] in animal feed, and the continued demand of the consumer for reduction in the use of antibiotics by the FDA, there is a strong need for research alternatives to antibiotic use. There are limited options, due to consumer demand of animal products without antibiotics, creating a need for alternative production, animal well-being, and food safety. We urge NIFA to fund work in alternatives [00:28:00] to antibiotics. Thank you for the opportunity to make these brief comments, and we wish you success and will continue to support agriculture appropriations. Thank you.

Megan H.: Are there any questions for Mr. Sellers?

Richard Sellers: Great.

Megan H.: It's so nice to hear someone with that accent that Dr. Broussard has. You guys are [00:28:30] ... it's wonderful, I love hearing it.

Richard Sellers: Thank you very much.

Megan H.: All right, next up, we have Warren Courtney from Vecna Robotics. Heres for your slide. Good morning.

Warren Courtney: Thank you.

Good morning everyone. [00:29:00] My name's Warren Courtney, I'm with Vecna Robotics. Our companies founded in Cambridge, Massachusetts, and we're led by a man named Daniel Theobald. As I've come to work for the company, it was a complete change for me to come from my previous background of leadership in retail, over to robotics and working with Daniel. If

you ever get a chance to spend a few minutes with him, he is always thinking about the next solution, the next [00:29:30] opportunity to solve problems. He's been quoted in Boston Scientific, that, "We are trying to partners in the innovation process." Working with him is really a worldview. He's trying solve world issues. The theme for the company is, "Better technology, better world." It's truly a privilege to work with Daniel and with this group.

Did the slides [00:30:00] go? I saw it up there.

This concept that Daniel brings forward is called Twisted Fields. Excuse me. Vecna Robotics believes the most promising scientific opportunities for the advancement of food and agricultural sciences involves incorporating robots and [00:30:30] autonomous platforms into the agriculture industry. We seek to bring our mature robotics and autonomy technology to the area of precision farming, and agricultural technology. With extensive experience in the areas of automation, machine vision, and human robotic interactions, Vecna's technology can readily be adapted to the agricultural [00:31:00] application can provide immediate benefits to the industry.

The agricultural market is faced with several challenges. Lower yields year over year, there's becoming a strain on the food supply, and the US farmer is experiencing a 45% drop in net farm income since 2013. Labor shortages are increasing, [00:31:30] along with prices increasing. But one of the primary things that we would like to address, is there are millions lost in crop rot, and we want to increase productivity of yieldable produce from the agriculture industry.

We believe there's an incredible opportunity with automation. We seek to disrupt the large equipment [00:32:00] cycle for the farmer. The transition that was made throughout history, when the farmer started using tractors and heavy equipment was really revolutionary to the industry. We're seeking to produce that same type of yield improvement to the industry, through this automation process. There'll be a less reliance on labor. We also look to minimalize [00:32:30] the use of chemicals through precision farming. We want to unlock the yield potential for the farms. We're focusing on automating redundancies in the processes. Precision spraying, harvesting, and seeding, will help make those improvements in the industry.

[00:33:00] Our model that we're bringing forward is the precision farming rover. It provides localization, navigation, power management, communications. This unit is autonomous, and it's also solar-powered, and it's low cost, which will make it affordable to each farmer that needs one. [00:33:30] It can do a multitude of different things, from soil sampling, weeding, harvesting. I'm not sure if you're familiar with bricks testing, but we're doing some work with bricks testing in harvesting to help reduce the amount of lost crops that are ready for harvesting.

So the strategy [00:34:00] is to disrupt the agriculture industry by offering a robust and proven autonomy system at a cost that makes automation

affordable for every farmer. We want to make this, also, solar powered, which will reduce the farmer's dependency on energy, and allowing farmers to trade carbon credit. We want to make this easy to make this a world-wide application [00:34:30] so that everyone can access this.

We have a diverse team of people that are working on this. They come from all backgrounds across all industries and not just anyone can work at Vecna. We have a lot of people with some very, very staked resumes that weren't able to move and provide things as quickly as possible. So, it's truly a unique blend. [00:35:00] We have a location in Cambridge, Massachusetts, as stated earlier. But we also have 127 acre farm that we're working in San Gregario, California. We're looking to provide a low-risk, high reward for the farmers that are there.

The opportunities are endless. Through precision fertilization, planting, and spraying, we really hope to revolutionize the industry. [00:35:30] By the year 2024, it is projected that robotics will be at a $5.7 billion level in the agriculture industry.

Vecna has submitted proposals and been awarded funding for grants addressing the USDA's research priorities. Specifically improving crop production methods [00:36:00] or strategy, crop protection against antibiotic and biotic stress, and energy conservation. Vecna's prime goal is to create technology that is affordable to both purchase and maintain, and easy to use and support. We seek to address environmental and climate concerns that impact food safety, labor shortages, and maximize crop yields.

[00:36:30] Again, Vecna looks to be the perfect partner for innovation. We truly are a company striving for better technology, a better world, and better agriculture. Thank you.

Megan H.: Thank you. Do we have any questions. All right. Why don't you come back up here, and can you please [00:37:00] introduce yourself?

John V.: Yes, I'm John Verboncoeur from Michigan State University and also from the IEEE. My question is about your platform. So you essential need a pretty high compute performance to do some of these functions like machine vision. Does that live on the platform itself? Does that go to the cloud? What networking do you use to connect those?

Warren Courtney: We're working primarily in warehouses, right now, with the platform, and we're transferring [00:37:30] that technology over to agriculture. I believe it's on the cloud, but I'm not 100% sure.

John V.: Okay. Thank you.

Megan H.: All right. Thank you so much.

Warren Courtney: Okay. Thank you.

Megan H.: Okay, next up is Dr. Michael O'Neil from the Northeast Extension Directors. Thank you.

Michael Neil: [00:38:00] Good morning folks. I guess if Meryl Broussard joined the NIFA in the Lincoln Administration, I must have joined in the Truman Administration. It was a long time ago. Still see some familiar faces, but there's a lot of new folks there at NIFA as well. Just full disclosure, I used to work at NIFA, so I have mixed feelings about when we offer comments to them, how direct they should be. Because [00:38:30] I used to have to answer those comments.

I'm here on behalf of the Northeast Extension Directors. We represent land grant universities from Maine to Maryland, West Virginia, and the District of Columbia, 12 states and the district. We have some of the largest land grant universities in that system, but we also have many of the smallest land grant universities in that system. In the northeast, we also have partners at historically black land grand universities, West Virginia State, Delaware State, [00:39:00] and the University of Maryland Eastern Shore.

I have five points that I want to make this morning, so we're going to keep rolling faster, even though I know my friends would say, "If you put O'Neil on the stage, you won't get him down for a long time." I'm not going to do that today.

The Northeast Extension Directors support the concept of addressing sustainable food systems, and it's felt like a really great setup to have the folks that came before me talk about the things that they're interested in, because it is very much complimentary to what we're interested in. We want to ensure that [00:39:30] the unique characteristics of agricultural systems of the Northeast are well represented in NIFA's approach.

The Northeast is home to over 60 million consumers, representing a substantial proportion of food consumption and funding opportunities. For us we believe the funding opportunities that promote sustainable practices for consumers, not just producers, are essential in solving all of our food problems. We're committed to promoting agricultural literacy for consumers across rural, suburban and urban settings. [00:40:00] We believe that there is a need for integrated programs and projects, where research, education, and extension are used to develop and implement innovative approaches to promote sustainable consumer behavior. We want you to focus on some consumer behavior, not just producer behavior.

Secondly, there's a great diversity of agriculture in the Northeast, that involve food and non-food systems. The Northeast Extension Directors encourage NIFA to make available grants that support all of these diverse agriculture [00:40:30] activities, including small and large systems. In the Northeast, high tech, climate

controlled agriculture represents a major opportunity to expand food production, particularly in urban and some ex-urban environments. These production systems are unique, and we encourage you to include opportunities to conduct integrated work in these environments, not just field based agriculture.

The most recent agricultural census revealed a growth in the number [00:41:00] of farms and the number of farmers in New England. Much of this growth is occurring in small acreage, organic agriculture. Interestingly, and it couldn't have been a better setup, but the technologies that have been developed for agriculture, mostly, have been developed for large commercial agricultural systems, and often these are not scalable for use by small farms, particularly the small farms in New England, where income may be $25,000 or less. We request that NIFA support [00:41:30] applied research to improve sustainable small farms in the Northeast. We see this as also expanding the role of NIFA in meeting the global food supply, because many international developing nations are really dealing with small acreage landowners, and their role in agriculture. We believe that what we're doing across the Northeast has particular value in supporting development of sustainable agriculture around the globe.

Thirdly, [00:42:00] we see that there's very little competitive funding that exists for single function extension activities to create real impacts on the landscape. So, we would just encourage NIFA to increase the funding available for extension led projects that lead to measurable outcomes in appropriate, integrated programs. I think appropriate is the key there, in that not every program is going to be focused just on extension, but we see lots of single function research activities available, not as many single function extension programs available.

[00:42:30] Fourth, we support the use of evaluation expertise to measure outcomes of funded projects. For very large projects, and NIFA has funded many in the $5 million and larger range, it's appropriate to require external evaluation. But on smaller projects, we would recommend that internal evaluation be sufficient. That's particularly important for small institutions, where we have less capacity to be able to do that external evaluation, and where the cost is considerably higher [00:43:00] than what they can typically afford.

Lastly, this is my last point, I am compelled by my colleagues, so I just want to make that clear to NIFA, to point that the Northeast region extends far beyond the District of Columbia and the beltway. Please consider your future meetings in many of our wonderful destinations to the north of here, which might include places like Wilmington, Philadelphia, Atlantic City, New York City, Hartford, or Boston. The Northeast is a big region. Please [00:43:30] come visit us. We could use your economic support.

Thank you very much for the time to talk to you.

Megan H.: Okay. Any questions? All right. Quiet group this morning. We'll just keep rolling along. Next up is Ed Jones, from the Virginia [00:44:00] Extension Service, and he will talk to you right now.

Ed Jones: Thank you, Megan. It's always dangerous to follow Mike O'Neil. Good morning, everyone. I want to thank you for the opportunity to participate in this session of NIFA Listens, and let you know I am Ed Jones. I am the Associate Dean in the College of Agriculture and Life Sciences at Virginia Tech, and I'm Director of Virginia Cooperative Extension. Virginia [00:44:30] Cooperative Extension is strong and established partnership of Virginia Tech and Virginia State Universities.

I spent my entire professional career, which spans over 30 years, in extension. I started as an extension wildlife specialist at Mississippi State University, then to North Caroline State University, and now at Virginia Tech. It's been my privilege to serve extension in a number of leadership roles, regionally and nationally, over the years. As examples, [00:45:00] I served as the founding chair of the National 4H Wildlife Habitat Evaluation program, President of the National Association of Community Development Professionals. You can beat me up later, Stacy. I've also served as Chair of the Extension Disaster Education Network. I currently serve on the executive committee of ECOP, the Extension Committee on Organization and Policy, which is the representative body of the cooperative [00:45:30] extension section of APLU. I also co-chair ECOP 4H leadership committee. The ECOP 4H leadership committee was created in 2014, and it provides policy guidance for 4H nationally, and is a partnership of the extension system, NIFA, and national 4H council. Today, I'm speaking on behalf of ECOP, and I'm glad to see Dr. Qureshi has on his 4H tie today. [00:46:00] We appreciate that.

As I approach the questions posed, I would first like to say that ECOP, in seeking to develop a strategic direction for ECOP for the coming years, went through an inclusive process to determine the programmatic priorities for the system. These priorities are nutrition, health and wellness, positive youth development, water quality and quantity, food production and food security, and community development.

[00:46:30] In response to the first question, an overarching priority is that of a balanced portfolio of capacity and competitive funding provided by our federal partner. This is an important issue for extension and research. Extension and research at Virginia Tech work in very close partnership, and we often say that it is impossible to say where one ends and the other begins. In that integrated context, capacity funding provides the ongoing infrastructure [00:47:00] to support programs and initiatives, and competitive funding provides opportunities to focus for a limited time on a specific question or issue.

Capacity funding is the foundation upon which extension can be responsive, flexible, and innovative. I encourage my colleagues at Virginia Tech to take risks and to try new approaches, new methods, or new program topics, knowing full

well that some of these will not be productive, [00:47:30] but others may produce profound and unexpected results. Being accountable in a programmatic or project sense, could stifle such creativity, and limit innovation that is desperately needed.

Other examples of the importance of capacity funds can be seen in disaster response and recovery, and in positive youth development. In the south, hurricanes are an all too often occurrence. Extension faculty and staff at all levels, [00:48:00] must have the ability to immediately change their programs, and activities to address the pressing needs of their communities and clientele. Immediate action is, of course, critical. But just as important is the long-term recovery process. Extension is still in the community long after other state and federal agencies, and non-government organizations have moved on.

I've seen this importance firsthand. While in North Caroline, I directed the six months long [00:48:30] animal mortality disposal program, following Hurricane Floyd in 1999. I also had the privilege of managing the State funded disaster assistance enrollment program for housing and agriculture assistance, followed by subsequent hurricanes. The presence and commitment of extension in those impacted communities can often be the key to a faster and more successful recovery.

Capacity funding is also critical in supporting [00:49:00] positive youth development. Positive youth development is a long term proposition. The ECOP 4H leadership committee has adopted the goal of growing 4H from 6 million participants enrolled, to 10 million by 2025. To do so will require creative and new ways of reaching youth who have not had access in the past, in a manner that is attractive and inviting to youth of various cultures and backgrounds, and provide the opportunities [00:49:30] for growth for those youth, that are not available by any other means. This growth and participation is critical to providing the productive, responsible, and civically engaged individuals needed to lead us into the future.

The future of agriculture in our communities depend upon a productive workforce. Be they scientists, producers, entrepreneur, or educators. To achieve these ends, stability in youth programming is critical. That stability [00:50:00] is ensured through capacity funds. Adequate capacity funding is critical for the success and stability of all our land grant institutions to meet the extension and research needs of the future.

In response to the second question, I offer two topics of importance and opportunity. The first is big data. As the issues we address in extension become increasingly complex, it requires new approaches on how to focus and be impactful and relevant. [00:50:30] The science behind data development, management, analysis, and interpretation, are critical to making quality decisions to be sure we are meeting the most pressing needs of our communities.

As an example, the Social Decision Analytics Lab in the Virginia Tech Bioinformatics Institute, and Virginia Cooperative Extension are partnering with Iowa State University in the development of a community driven, data learning, discovery process. [00:51:00] This process commences with a data discovery workshop, by asking local leaders what questions they have, but cannot currently answer.

The process continues with identifying data sources that can provide insights, wrangling the data using statistical and geospatial learning, along with the communities collective knowledge to inform policy decisions, and then developing, deploying, and evaluating intervention strategies, based on scientifically based principles. [00:51:30] The expectation is that extension in other agencies and organizations can focus in on the most pressing needs and develop solutions. This project has led to a larger conversation of the regional rural development centers, and extension faculty across the country, on the use of data in new and innovative ways, not previously conceivable.

I also want to return to positive youth development in 4H. In order to meet the challenge of growing [00:52:00] leaders for the future, significant investment and attention are needed to understand youth development in the digital age, and to evaluate and develop methodologies for attracting and retaining youth from various cultures into positive youth development programs. The development of evaluation impact assessment tools are important to continual improvement of positive youth development approaches, and there are significant research and extension opportunities, should resources be available, that would result [00:52:30] in a more impactful approach to growing future leaders.

Again, I want to thank you for the opportunity to participate this morning, and speak to you on behalf of ECOP. We look forward to our continued and productive relationship between the Cooperative Extension System, and the National Institute of Food and Agriculture. Thank you.

Megan H.: Thank you. Any questions? We have another [00:53:00] minute. All right. Next up, we have Robert Taylor, Jr. from West Virginia University, the Division of Animal and Nutritional Science.

Robert Taylor: Good morning. At the break, Dr. Broussard, [00:53:30] Mr. Sellers, and I will hold an accent competition, to which you're all invited. Thank you for the opportunity to present at this NIFA Listening session. I speak on behalf of many scientists, whose research efforts rely on defined genetic stocks that encompass highly inbred, random bred for many years past, [00:54:00] long-term selected, or single gene mutants in poultry and livestock. Their research results benefit producers and consumers, while contributing to broad science knowledge. Genetic impacts on disease resistance were elucidated using such stocks, providing a basic research foundation for improved animal health.

My research [00:54:30] outputs over 39 years would have been very different without those resources. In 1999, the Avian Genetic Resources Taskforce, highlighted the critical status of many genetic stocks. The USDA initiated the National Animal Germ Plasm program, to conserve resources, primarily through cryo-preservation, a method [00:55:00] which functions quite well for multiple species, but is less adequate for poultry. The program also developed national recognition for designated elite genetic stocks, following nomination, committee vetting, and approval.

Resources I developed over 23 years to examine genetics of disease [00:55:30] resistance were recognize in 2005, but were eliminated in 2007 to meet budget constraints. The national recognition offered little, beyond moral support. Within the last decade, stocks have been eliminated by the USDA ADOL, the University of Wisconsin-Madison, UC Davis, Iowa State University, and [00:56:00] others. Multiple commentaries in prestigious journals, including Science, Nature, and Poultry Science, describe the critical nature of genetic resources and their plight. Appeals to NIFA, as well as the USDA, generated little enthusiasm, and less understanding for the dire states of these valuable assets.

[00:56:30] Available resources continue to decline, via eradication that often leave no time for disbursement to alternate sites. Loss of biodiversity impacts food security in the face of predicted human population increases. The research community is near having genome sequences on a flash drive, but no live animal [00:57:00] resources.

A funding mechanism for special collections of unique poultry and livestock, is needed. Particularly in light of continued resources laws, and the advancing age of many curators. One concept would be a central facility that handles agriculture species, similar to the Jackson Lab for Mice. [00:57:30] Another option is grant support beyond capacity funds, for special stocks at their current home institution. The Livestock Conservancy seeks to protect endangered livestock and poultry breeds from extinction. That organization and others can contribute to the overall solution.

The blueprint for USDA efforts in agricultural animal [00:58:00] genomics, 2018 to 2027, under current development, should prioritize resource preservation. Let's work together to move genetic resources beyond the well-known weather description, "Everybody talks about it, but nobody does anything about it."

I have several additional bullet points, which may merit elaboration outside [00:58:30] of today's proceedings. First, NIFA should develop a "can-do" attitude that seeks solutions.

Second, colleagues of mine report difficulty in accessing sequences, chips, databases, from particular sources. Broad use of such important resources benefits all of agriculture, rather than individual [00:59:00] stakeholders, in the spirit of USDA's overall mission. Resources developed with public funds, should

be available to the entire research community, without complication. NIFA needs to press on this point.

Third, there should be greater communication among NIFA staff members. A different colleague of mine was encouraged by [00:59:30] a NIFA staff to submit a proposal, highly relevant, to a program for emergency funding on pressing issues. The submission arrived, underwent internal review by a person unaware of the prior encouragement, and was subsequently classified as, "Not relevant." At a minimum, such situations challenge perception [01:00:00] and create a credibility gap.

Next, avian influenza and salmonella were excluded from a recent stakeholder survey highlighting important animal diseases. Were these omitted because of their relationship to human health and food safety? No matter the reasons, such items should have been listed in both areas, as avian influenza [01:00:30] and salmonella impact health in both animals and humans.

Finally, NIFA liaisons need higher emphasis on their interactions with multi-stake committees, academic scientists, and other stakeholders. Such groups represent a neglected source of grassroots information about research needs.

Again, I thank you for the opportunity to speak [01:01:00] with you today, and I'll field any questions. Thank you.

Megan H.: Any questions? Thank you so much.

Robert Taylor: Thank you very much.

Megan H.: All right. Is Janis Wills here? Okay. That [01:01:30] brings us to our morning break, and we are way ahead of schedule, so I'm wondering if Eugenia would be willing to come up. Wonderful. Eugenia Gusev is from the International Rescue Committee. Thank you. Appreciate your flexibility.

Eugenia Gusev: Okay. Let me make sure I figure out the slide. [01:02:00] Okay. So, thank you for the introduction and for your time today. I work with the IRC and I'm based here locally, in Silver Spring. The IRC is an international organization, but in the US we work with refugee resettlement. But we also have a lot of programs that focus on food security and agriculture. We also work abroad in Africa, Asia, and the Middle East in humanitarian aid, and development settings, where [01:02:30] we also have a lot of agriculture and food type programs.

In the United States we have about 13 offices that focus on this type of programming, and broadly speaking, these are our areas of focus. We have farms and gardens, food security and nutrition. We focus a lot on underserved populations. We have farmers market's, and we also work a lot with youth and women around food justice programs.

[01:03:00] Just to give you a little bit of insight, in terms of our latest impact. In the last calendar year, we served almost 5000 clients across the United States. We generated, through our farming activities, about $98,000 in income, and then we have, as I said, 13 different locations across the United States, where we do farming and food security work. We also, [01:03:30] in the way that we approach food and farming programs, we focus on the individual, but we do a lot of systems work. A lot of our programs are faced at working with the community, designing our programs with the community, and really looking at local need.

We are CFP and FINI grantees. The sole sources of funding have been incredibly beneficial to expanding our food security and nutrition, and agricultural programs. We are very thankful to NIFA and USDA for [01:04:00] their support.

In terms of areas of interest, I spoke with my team, and just having had experience with IRC over seven years now, I have some idea of where we would love to see more investment and what's working, and what would help support the communities that we're working with. We're seeing a lot of opportunity to invest in testing and developing ethnic [01:04:30] crops, and testing them across the United States in different regions. Many of these crops, currently are not very well known. They have incredible nutritional benefits. We've seen in supermarkets in the last 10 years, the rise of ethnic crops, like Canola, and certain types of goji berries, things that nobody has ever heard of 10 years ago. But now they've become really popular.

There's a lot of these crops that are there, and are difficult to find, [01:05:00] for the communities that we are working with. We are working with farmers who know how to farm this produce, and we know that it's growing very well, in certain climate zones. We'd love to see a little bit more in researching how well these crops can be adapted, marketed, and consumed. And also looking at the nutritional benefits, across the board.

Another area is, looking at food access specifically, evaluating the impact [01:05:30] of nutrition incentives to other populations, beyond SNAP eligible clients, and also widening the type of food allowed under these programs, to WIC and SSI recipients. Before we had FINI, we had a similar type of, we called it the Fresh Fund, so dollar for dollar match on our farmer's markets, on fresh produce. We call it the Fresh Fund, and it was supported by private funding at the time. It [01:06:00] still is. We have this funding in parallel with FINI. We, at the time, did not restrict it to SNAP, so we know that there is a great need for this. The redemption rate is very high, and when we do have ability to give out WIC and SSI dollar for dollar incentives.

Then, widening to other produce, local produce, like meats and cheese, and healthy carbs, and eggs, again to support local production. But also to give people a little bit more choice and a more balanced diet. [01:06:30] I know that nutrition incentives are meant to be a supplement to SNAP, but we also know that a lot of the communities that we work with still struggle to live on SNAP

amounts. So restricting their diet to fresh fruits and veggies, with this incentive program that currently is ongoing, it would be interesting to just look at the impact of widening the scope of that, to create a little bit more choice for the people that we're working with.

[01:07:00] I would also, just because I come from an international programs background, would love for us to look at and model, and maybe test some international approaches, to these type of incentive programs. If you Google cash programs, there's quite a bit of evidence that's coming out, around restricted and unrestricted cash programs. I think there's a lot of things that we can potentially learn from, that are happening abroad. So it would be great to create opportunity to test models from [01:07:30] abroad here in the United States context.

Around food education research, one of the areas of my focus is working with community health promoters, to do outreach in disadvantaged communities and ethnic communities around nutrition education, management of diet related diseases. As of late, we've been making a lot of connection between our community health promoter and our farming and our market programs and our incentive [01:08:00] programs. We see that this type of model, which is evidence based in certain areas, is very malleable, and works really well, hand in hand with a nutrition incentive programs, so we would love a little bit more investment and research as well, in this type of behavior change education, using community health promoters, as currently the evidence base, as I've seen into, is very, very specific along HIV, AIDs management, diabetes. [01:08:30] But not so much around broader issues that touch nutrition, especially for ethnic communities in the United States.

I think there's lot of opportunity to do research, to build more on an evidence base, there. It's very flexible and cost effective model. But as I said, it would be great to see a little bit more investment, to see how it works, and what types of behavioral change education work better, in the home, or maybe at the farmer's market, or more wider scale in the community. There's a lot of iterations there that can be [01:09:00] tested, and it's always difficult to find funding that will fund the operational aspect of the program, and also the research element in such a way that it's impactful.

Around food research, we would love to see some investment through building an evidence base on cost-effectiveness and impact of food incentives on very specific heath issues affecting communities. For example, through my work, I see that our minority populations, we see that a lot of our [01:09:30] clients were coming with iron, calcium, and B12 deficiencies. So addressing specific health concerns, which are found in underserved, immigrant, and refugee communities through health food access farming and urban gardening, and studying the short and long term impact in addressing these public health concerns. Doing some comparative cost studies would be really impactful for our populations and the wider community.

As is said, again, we've got the operational end, but getting enough funding to really have an impactful, large scale [01:10:00] study. We're not health practitioners, we would have to partner up with a medical institution, and to get access to that level of data, and to have enumerators. All of these costs, they add up. So getting enough funding to be able to run this type of intervention, plus the research would be really impactful.

Then, a cross cutting theme, which I think you've already gleaned from my presentation, is evaluating equal access and equity [01:10:30] along racial and ethnic lines, for food access interventions, to ensure access to point of sales and SNAP incentives across the board. I'm thinking, or we're thinking, that there's really a need for a human centered design. There's a real opportunity to do that, to test through the cultural, the geographic, and attitudinal barrier's lens, to see how incentives are reaching these disadvantaged communities.

I will end with that. [01:11:00] Just in conclusion, while my topics focused very much on minority populations, we do feel that the impact would be far greater, and impactful on a much larger scale. We are very grateful to the continued support of NIFA and USDA for our programs, and their investment in a scientific approach to solving complex public health and agricultural related issues. Thank you very much. If you have any questions.

Megan H.: [01:11:30] Are there any questions for Eugenia? Okay, so I would like to know if Marcia Delonge is willing to go a little bit ahead of schedule? She has a PowerPoint as well. Thank you.

Marcia Delong: Good morning, still. I am Marcia [01:12:00] Delonge. I am a senior scientist at the Union of Concerned Scientists, which is a science based, non-profit advocacy organization, just here in DC. First, I wanted to thank NIFA for also providing this opportunity, this tremendous opportunity to provide some comments on priorities and science directions for food and agriculture. I am here today to really talk about the promise of agroecology. [01:12:30] So thinking about an ecological system science approach, that really looks to support farmer livelihoods, while also achieving environmental and social benefits to really advance the fields of food and agricultural science. And make the case that this could be a really valuable area for NIFA to continue to invest more in.

The [01:13:00] need to prioritize the agroecology within public research funding is something that Union of Concerned Scientists has been working on for quite some time now. In response to hearing a lot from colleague scientist around the US, that this was an area of great promise, but one that had very limited funding going into it, we actually crafted this sign on statement that articulated some of these concerns that were coming from [01:13:30] scientists. Today, nearly 500 experts and counting have signed this statement. So we think this is a really important document that shows that scientists across the country really do have a demand for more resources to do this kind of important research.

Given this widespread sentiment that more public funds might be needed for this kind of research, to fill these important [01:14:00] gaps in knowledge, we wanted to better understand what the current landscape, the current state of funding within US public funding sources actually looked like. So, this is just a snapshot from a study that many of you might be familiar with that we did a couple of years ago, actually digging in a little bit and looking at NIFA funds, public funds, for agriculture research overall, and looking to identify different components [01:14:30] of research, across research programs, and really seeking where agroecology practices and ideas were showing up. The bottom line of this research was that, relative to some of the other areas of research that are very important, like increasing efficiency and working towards substituting in new practices that have become understood to be more damaging or concerning, agroecological [01:15:00] practices, which really think about redesigning systems, and then the social research that looks toward, "How would we scale these practices up," is a little bit more limited.

To build on this growing understanding of the landscape for public funds for agroecological research, we developed this survey, which we conducted last April. It was really meant to ask the scientists to [01:15:30] articulate even further, what they felt were the opportunities, obstacles, and needs, surrounding public support for agroecology. The questions for this survey were peer-reviewed and IRB reviewed. There were 28 questions, and we released this survey very broadly, to make sure that anybody who was interested in responding would have an opportunity. So this survey is newly available on the UCS website, at www.ucsusa.org/agroecologysurvey.

[01:16:00] We did get 176 qualified respondents. By qualified, all I mean is that these were people who had masters or Ph. D.s within sustainable agriculture related fields, and continue to work in this profession. I want to just point out quickly that they did represent a wide range of regions, as well as career tracks, as well as experience [01:16:30] in the field. So people who have been working in the field for less than 10 years or more than 10 years, were all part of this survey.

I wanted to, today, just highlight a few of the top priorities for research that really emerged in analyzing the responses that came from this survey. The first one is this need to have grants available at a wide range of scale. [01:17:00] This was mentioned earlier today, that really, critically, we need smaller grants for high risk and pilot projects, but we also need to be thinking about longer grants for more complex projects. Especially when you think about agroecology and the system science, and the complex systems that that field is oftentimes looking at, recognizing that longer grants are really important.

A second theme that emerged from these survey findings, is that there's very much a demand, a growing demand, [01:17:30] I think, for interdisciplinary systems level of research. In particularly, research that emphasizes economics, human health, and equity issues. So, racial equity, gender equity, and really across the board. These kind of topics are very central to the mission of course,

of 1890, 1994, and 2004 university institutions. But of course they could be better integrated throughout land grant universities.

The [01:18:00] third theme is that scientists really express that they have a demand for additional training and encouragement that could help them communicate better. Communicate to a wide range of stakeholders, including farmers. Of course, there's a lot of that, but also the general public and policy makers. So, maybe there's a role of NIFA to play in strengthening programs that really help scientists have these skills.

In terms of the most promising opportunities for the science [01:18:30] in food and agriculture, we are finding and we believe, that continuous living cover practices. So practices like cover cropping and perennials, and agroforestry. So, working lands, unworking lands, is a very promising opportunity, even within the umbrella of agroecological research. This research and looking at these practices from the perspective of research and development targeted towards supporting farmers, and promoting diverse jobs, [01:19:00] reducing erosion, mitigating droughts and floods, increasing resilience, thinking about the food-energy-water nexus, systems science, and again, how can these kinds of systems be developed to address inequities, really offer some of the most promising opportunities. I just wanted to say that these are ideas and promising areas of research that are supported through a growing body of work that we've been involved with, but we're also seeing it coming out of the peer-review literature [01:19:30] from land grant universities and other institutions across the country.

I want to end there, and I just want to thank NIFA gain for the important role that you play in supporting public food and agriculture research, of course. And again, for the opportunity today to share some ideas. Thank you.

Any questions?

Megan H.: [01:20:00] Okay. Do you all have one more in you before our morning break? All right. Is Gina Luke here? Wonderful. Thanks for being so flexible, and we will just move our break up a little bit. It's about 9:50 now, so we will break from 10 to 10:20. Thank you.

Gina Luke: [01:20:30] Good morning. Thank you for the opportunity to speak with you this morning and participate in this NIFA Listener forum to highlight food and Ag, and research education extension priorities. I'm Gina Luke, I'm an assistant director in the AVMA's Governmental Relations Division. Our association represents about 90,000 veterinarians practicing across the United States.

The AVMA [01:21:00] strongly advocates for research to improve animal health and welfare. Ultimately, that impacts human health. We strongly support the National Institute for Food and Agriculture, and it's entire array of programs impacting animal health. Understanding how change in management practices that impact herd or flock health is essential for future advancement in food,

animal agriculture. A top priority [01:21:30] for NIFA must be developing data driven models of how changes in management practices influence animal health and welfare, environmental health, and ultimately human health.

Specific examples to accomplish this, include innovations that allow monitoring of antibiotic resistance in field situations, and how changes in management practices influence key indicators of animal health and/or welfare. Similarly, efficient food [01:22:00] production, as well as animal or individual animals is optimized by good animal health. Management practices to promote animal health must be investigated with a special emphasis on the effect of nutrition, on prevention of disease, correction of physiological imbalances, and efficient energy utilization.

Research into other management practices include sanitation and hygiene conditions that may lead to a reduction in the exposure of humans to animal [01:22:30] pathogens. The AVMA urges NIFA to nurture and prioritize training of today's and tomorrow's scientists to be valuable resources in control, prevention, diagnosis, and treatment of environmentally associated diseases in people and animals.

The agency is encouraged to continue partnering with other federal agencies to support interdisciplinary research. We believe it is essential for NIFA to bolster training [01:23:00] opportunities for pre- and post-doctoral students to engage with and focus on animal health and research, in the natural and altered ecosystems of our cities, our farms, and wild areas, as well as agriculture and biomedical research.

We urge the continued support of advances in minor use animal drugs, for the use of drugs in a minor way with major species. [01:23:30] For those minor species who don't have drugs, we would urge NIFA to engage in that process, in the development of those opportunities. We believe this will foster scientific partnerships that lead to real solutions in solving environmental, food safety, and trade issues, as well as re-emerging and new emerging diseases that affect our world.

On a side note, we encourage NIFA to continue its investment in programs that make [01:24:00] sure that veterinary services are available in rural and underserved areas of our country, namely through the veterinary medicine loan repayment program, and the veterinary services grant program. One of those, the long repayment program, has helped make sure that veterinary services are available in rural areas and in underserved areas of the veterinary profession. There's been over 388 awards since 2010, and we just saw the second cycle of awards for the veterinary services grant awarded in September, [01:24:30] and so we applaud NIFA for those particular programs.

The AVMA believes that recruiting and training scientists who are uniquely qualified to engage in NNVO studies will help current and future health needs, related to both a healthy food supply, as well as the control of zoomatic

diseases. It is critical that NIFA increase its investment in livestock, poultry, and aquaculture. Control of endemic, enzootic animal diseases ought to be a top [01:25:00] research priority for our federal, our state, and local governments, and our land grant colleges. This include the development of new diagnostic assays for earlier recognition of pathogens, as well as the development of new vaccine strategies to control the transmission of pathogens from animal to animal and animals to humans.

We urge NIFA to continue its investment in the tactical sciences, and we applaud your efforts in that area. We specifically want to draw attention [01:25:30] to the Food-Animal Residue Avoidance Data bank, the National Animal Health Laboratory Network, again, the Minor Use Animal Drug Program, the Food Ag Defense Initiative, and the Animal Health Disease Research Program.

Research is needed to better define the mechanisms by which microbes can change, mutate, or adapt to host species, or become resistant to existing antibiotics. Emerging infectious agents must be characterized in their interactions with the host, [01:26:00] and the environment defined. Research efforts should explore the possibilities that new bio-technologies provide for the development of novel and improved diagnostic tests to identify infected animals, and new vaccines to protect both animals and humans against clinical disease, and prevent transmission of diseases.

NIFA must be at the scientific forefront of rapid identification and eventual control of new and [01:26:30] emerging diseases, which require surveillance and monitoring of diseases patterns in humans and in animals. We urge NIFA to emphasize development of new antimicrobial agents, as well as the development of alternative strategies for treating and preventing infectious disease.

Finally, NIFA's support for research that advances the development of objective and evidence based criteria for the assessment of animal welfare for all species, is important. NIFA is encouraged [01:27:00] to foster research to enhance understanding of animal welfare. The health and welfare of animals under human care is an important and increasing societal concern. Veterinarians play an essential role in determining the standards of care, and protecting the wellbeing of animals used as companions, for production of food and fiber, and biomedical research, in work and in exhibition, as well as entertainment, and again, for those in shelters and sanctuaries.

[01:27:30] We want to associate ourselves with the comments of the next person who you'll hear, I believe after the break, Ted Maschima. Dr. Ted Maschima from the Associate of American Veterinary Medical Colleges. We stand in solidarity with the AAVMC.

We thank NIFA for this opportunity. Take any questions you might have.

Megan H.: [01:28:00] Any questions? So it seems like this prominent microphone is not encouraging for people to make questions. Dr. Qureshi. [inaudible 01:28:12] stay up here. Can you use the mic so folks online can hear? Thank you.

Dr. Qureshi: Thank you. Thank you very much. In our previous listening sessions across the country, we heard a lot about trans boundary diseases. Can you expound on that, what is AVMA's position [01:28:30] or guidance to us on trans boundary diseases?

Gina Luke: Well, what I would say is, the AVMA, along with our other stakeholder partners, would really prefer to have much more scientific focus on the ability to ensure that [01:29:00] we are addressing diseases that go from people to animals, animals to people, from animals to animals. Outside of that, can I defer to Dr. Maschima, or perhaps Dr. Stomp, in the audience? You want to come up, Lauren?

Lauren Stomp: [01:29:30] Lauren Stomp, also at AVMA in government relations division. To your question, I don't know that AVMA has a stance, necessarily, formulated on trans boundary diseases. We are certainly interested in having research and looking at diseases, as Gena said, that are zoonotic, or transfer between animals, regardless [01:30:00] of where those pathogens arise, or where those diseases are. We're certainly concerned with zoonotic diseases, with diseases that are vector born, and with the one health concept, and human and animal health. So, trans boundary diseases would be one of those components that AVMA would be interested in seeing further research and attention applied to, in the greater context of disease research, animal health and welfare, human health and welfare, as well.

Megan H.: [01:30:30] Any others? All right. Thank you.

Megan: Thanks again for everyone that came out today. Just in case you missed our last three listening sessions, we do have the live video from those sessions up on our website as well as transcripts from those sessions. You can catch up on what all the other stakeholders had to say at these listening sessions over the last three weeks.

Next [00:00:30] up, we have Dr. Ted Mashima from the Association of Veterinary Medical Colleges. We're just going to proceed with our agenda from here on out. It looks like we have almost all speakers here. Just be ready when we get to you. Thank you. Take it away.

Ted Mashima: Good morning, everyone. My name is Ted Mashima. I'm the senior director for Academic [00:01:00] and Research Affairs for the Association of American Veterinary Medical Colleges, AAVMC. AAVMC would like to thank the National Institute of Food and Agriculture for this opportunity to provide input on research extension and education priorities in food and agriculture. Personally, I want to acknowledge that NIFA has always listened to us at AAVMC. Sonny

Ramaswamy, Margo Holland, Peter [00:01:30] Johnson in particular are face is quite familiar to the members of our association. Thank you.

The AAVMC is a nonprofit organization that coordinates the affairs of 49 accredited colleges and schools of veterinary medicine including all 30 colleges of veterinary medicine in the United States as well as 19 internationally. The AAVMC also has affiliate members including seven departments of veterinary science and [00:02:00] seven departments of comparative medicine at American institutions.

The AAVMC represents about 4000 faculty, 5000 staff, 10,000 veterinary students and 3000 graduate students at these institutions. Through enterprise-wise efforts to analyze, catalyze, and advocate, our goal is to create a better future for the profession of veterinary medicine by advancing the quality of the academic institutions [00:02:30] that support it. My colleague, Gina Luke of the AVMA provided an excellent overview of the landscape of issues that are critical to our members, but what I'll do today is I'll share a specific area of AAVMC's engagements.

The AAVMC believes the antimicrobial resistance issue is one of the most serious public health threats facing the world. Solving this problem is going to require a one-health approach, which involves [00:03:00] full cooperation between the animal health and human health communities. The AAVMC and the Association of Public And Land-grant Universities, APLU, have been collaborating on a major antimicrobial resistance initiative since 2014. The goal of this effort is to focus and apply the power of American universities on solving the antimicrobial resistance problem.

We're making important progress, but much more work needs [00:03:30] to be done. The 2015 APLU AAVMC task force on antibiotic resistance in production agriculture, a report provided a blueprint for action. Subsequently, our antimicrobial resistance core competencies working group has produced a detailed plan for educating various groups of high school, undergraduate, and professional school students about the AMR [00:04:00] issue. This has been broadly shared within the education community at this time.

To build awareness and cultivate support on Capitol Hill, a legislative briefing on AMR was presented in the US Congress in the spring of 2017. Subsequently, we have convened two summits in April and September of this year uniting stakeholders from the AAVMC, APLU, AVMA, the World Bank, [00:04:30] the FAO, multiple agencies of the US government including the USDA, trade and professional societies in the private sector.

The goal of these meetings was to refine planning for developing a request for proposals and securing funding for the creation of a university-based national research and education center for battling the AMR problem. The AAVMC encourages the active leadership of NIFA to [00:05:00] support the research and educational activities that are necessary to deal with the critical issue of

antimicrobial resistance. Again, thank you so much to NIFA for the opportunity to provide input on what you guys will be doing coming up. Thank you.

Megan: Are there any questions for Dr. Mashima? [00:05:30] Thank you. All right. Next up, we have Sarah Ohlhorst from the American Society for Nutrition.

Sarah Ohlhorst: Hi. Good morning. I'm Sarah Ohlhorst. I'm the senior director of Advocacy and Science Policy [00:06:00] at the American Society for Nutrition. I'm also a registered dietician. ASN appreciates the opportunity to be here today and to provide comments to NIFA. ASN is a not-for-profit scientific society with more than 6500 nutrition scientists and researchers working in academia, clinical practice, government and industry in more than 75 countries [00:06:30] around the world.

ASN currently reaches more than 36 million people annually with the highest quality nutrition information. Our members have been actively involved in the Agriculture and Food Research initiative, the competitive grants program that is administered by NIFA, both as recipients of such grants and by serving on grant review panels.

ASN is extremely appreciative of all the support that NIFA does provide to nutrition [00:07:00] scientists and researchers and also for NIFA's responsiveness to stakeholder input. ASN believes that a top priority in food and agricultural research that NIFA should address is human nutrition across the lifespan. While ASN fully supports NIFA's funding of research to better understand the causes of obesity and implement effective prevention interventions, it's also imperative that NIFA continue to support other [00:07:30] human nutrition research topics.

The US must maintain and enhance the potential for future scientific breakthroughs to be achieved in many areas of nutrition in addition to focusing on our most immediate public health concerns like obesity. To this end, ASN supports maintaining an emphasis on integrated programs and multidisciplinary teams while also providing significant funding for investigator-initiated applied [00:08:00] and basic nutrition research. Such research informs our understanding and implementation of health-promoting lifestyles and dietary practices to lead to future health advances, improve nutrition across the lifespan, and optimize quality of life and, therefore, should remain a priority at NIFA.

ASN identified the most promising science opportunities for advancement of nutritional research. These were called ASN's nutrition research [00:08:30] priorities whose advancement will have the greatest projected impact on the future health and well-being of global populations as well as on food and agricultural sciences.

The ASN nutrition research priorities, excuse me, are in the following areas; variability and responses to diet and food, which covers individual variability and metabolic responses to diet and food; the impact of nutrition [00:09:00] on healthy growth, development and reproduction looking at epigenetics and imprinting how exposures to dietary components during those critical periods of development actually program long-term health and well-being; the role of nutrition and health maintenance including non-communicable disease prevention and treatment as well as weight management throughout life; the role of nutrition and medical management; the [00:09:30] translation of nutrition research advances into evidence-based practice and policy to ensure optimal patient care and effective disease management across the lifespan; nutrition-related behaviors understanding the link between behavior and food choices to tackle obesity and other nutrition-related issues of extreme public health import.

Finally, food supply and environment, understanding how the food environment [00:10:00] affects dietary and lifestyle choices is necessary before effective policies can be instituted that will change our population's diet in a meaningful way. In addition, ASN identified five tools that are essential for advancing nutrition research to the next level; [omix 00:10:18], health and bioinformatics, databases, biomarkers and cost-effectiveness analysis.

ASN provides the large proportion of [00:10:30] NIFA support that's used to prepare the next generation of nutrition scientists by ensuring that training and careers are sustained for years to come. ASN considers this career training essential. I would like to suggest that NIFA also consider providing additional training opportunities such as for first time AFRI applicants. ASN also applauds the important work that NIFA does to promote consumer nutrition education, which is essential for achieving [00:11:00] public health by helping consumers to make informed healthy choices.

Again, I'd like to thank you for the opportunity to comment. We greatly appreciate NIFA's support of human nutrition across the lifespan, and ASN looks forward to future opportunities to work with NIFA to further enhance their human nutrition research contributions. Thank you. [00:11:30] Any questions? Thanks.

Megan: Thank you so much. All right. Moving right along, next up, we have João Dürr from the Council on Dairy Cattle breeding.

João Dürr: Hello. I would like to, first [00:12:00] of all, thank NIFA for the opportunity to provide our input in this important hearing session. People are talking about accents before. I'm not from the South. I'm Brazilian originally, but I'm the CEO of the Council on Dairy Cattle Breeding. I imagine I can't change the slides here if I can see. [00:12:30] Our vision is the Council on Dairy Cattle Breeding is an industry collaboration that benefits the dairy community by providing what we call gold standards because they are followed by most of the dairy industry

around the world in terms of genetic evaluations for the improvement of dairy cattle.

The idea is that, sorry, [00:13:00] it is simply a CDCB, as we call ourselves, is a nonprofit organization, represent the industry members that contribute data to the National Cooperator database. For many years this, National Cooperator database has been hosted by USDA in Beltsville. Recently, it has migrated to the industry in the consul because of mutual interest between priorities [00:13:30] of USDA and the industry. Basically, the idea is that we keep a non-funded cooperative agreement with USDA. USDA has full access to the data. They continue to do the research and development that benefits the industry in a pedigree.

But we provided services on behalf of our members. Basically, the database that we host is the largest of its kind in the world. [00:14:00] We have about 70 million pedigree records since the 50s, 130 million female performance records and two million genotypes, which is only exceeded by human database. It's no water species or any other type of group has more, let's say, genotypes represented in a single database [00:14:30] and about 500,000 dairy bulls receive genetic evaluations every ... Every week, basically, we have releases. Sorry.

We have four sectors that are member sectors; The Purebred Dairy Cattle Associations, which are the breed associations that you know, the dairy breeds, the [inaudible 00:14:58] so forth; National Association [00:15:00] of Animal Breeders, which represent the AI industry; the Daily Record Providers, which are the [DHS 00:15:07] guys that are the field operations and also the laboratories that analyze the milk and the Dairy Record Processing Centers that actually process the data on behalf of the DHS.

This translated in individual ... I'm not going to read all of this. Don't worry. But just to give you an idea, [00:15:30] the number of organizations that supply data to the national database including international partners that we cooperate with. Basically, these are the trades that routinely we evaluate for genetic and genomic evaluations in the US. We are currently developing cow health traits evaluations and also feed intake evaluations. They're not implemented official yet, but [00:16:00] we're going to do that very fast.

These are the gains and productivity. This is just fact just to exemplify, but the same trends are observed in other trades. If you see, if we didn't have any improvement since 1957, that's where we were going to be in terms of productivity, but we basically double that in these [00:16:30] 50 years. Then, if you see, half of this progress is improvements in management, and half of the progress is improvement in genetic potential.

This comes hand to hand, and both of them are driven by data that is collected in the farms. Where this data come from that it comes from everywhere in the farm. We can collect data and several of my [00:17:00] predecessors here were

talking about data collection and data use and data-driven actions. This is what we believe that is the future for the dairy sector. If we look at the cow specifically, we have several types of different information that we can obtain from the cow and that we are already doing.

What is your top priority in food agriculture research? This is the first question. We would say integration [00:17:30] of an application of genomic and on-farm sensor data to support precision management of dairy herds. The fact that we have the largest genomic database in the world doesn't make any sense or doesn't doesn't allow us to do anything unless we have phenotypes that can help us to make sense of these phenotypes. We need more and better and more diverse phenotypes that we can use the genomic tools [00:18:00] that are already making revolution in the sector in order to serve not only the farmers, but also the consumers because that will provide us means to improve the dairy production.

Our colleagues in the veterinary field, they also would benefit greatly from having this kind of data being driven into central databases. The dairy farm profiles are really changed, sorry, [00:18:30] are changing dramatically. Automation is taking place in our farms, but this data is being generated in completely random, let's say, fashion. We don't have any standards. We don't have the pipelines to make this data flow into systems that will help the researchers to provide new technologies and methodologies.

Our idea is that [00:19:00] NIFA would provide funding for developing a framework in which we could make this data available and be used for ... The research to develop a framework for the data being generated at the dairy farms and consequently utilize this data for supporting precision management. We're not talking about genetic evaluations or genomic evaluations only. The first [00:19:30] benefit has to be at the farm level if the farmer has to get the first benefit.

Otherwise, nobody will pay for it. But also, we also can use this data then to provide genomic predictions that will greatly benefit the future generations. This is our single suggestion that we establish this framework for data generated at the farm level. [00:20:00] I would like to thank NIFA for the opportunity once again. I'll be happy to entertain any questions.

Megan: Any questions? Thank you. I just wanted to pass along a message from the hotel. [00:20:30] Pepco is doing some work right out here. If you parked right out this back corner and have Maryland plates JH2165 or JK3593, please move your cars to a different location. There could be anyone. Next up, we have John VerBoncoeur [00:21:00] from Michigan State University. Thank you.

John VerBoncoeur: Thank you. As way of introduction, I am not in the agricultural area at all. My training is in nuclear engineering. My role at Michigan State University is as the associate dean for research in the College of Engineering. Separately, I've had several roles with the IEEE, the past president of the Nuclear and Plasma

Sciences [00:21:30] Society. We'll get to that why that's important here. Then, I'm also a director elect for the IEEE. Let's see. I get the thing here.

I don't think I have to say much about this the motivation for this work or this activity, this initiative of smart agriculture and by that, I don't mean just agriculture. I mean agri-food systems. You all know this I think better [00:22:00] than I do. I'll move forward through this. I'm hoping Megan will be a little lenient on the timing. I'm trying to catch us back up with our timing. What are smart agri-food systems?

What I mean by this is really technology applied to the food supply chain and each of the different nodes within that supply chain, but also in ways that connect those nodes together. You might imagine, for example, the possibility [00:22:30] to connect things, for example, with sensors that actually travel with food items whether it's at the container level or the item level throughout the food supply chain that tell you things like safety and freshness and so forth.

You might imagine things like technologies like blockchain being used not just for illicit transactions in the black-market but maybe also having a productive use for example being able to encrypt in transactions the places that touch a particular food items so that if you find a [00:23:00] problem in a food item, you have in the transaction log the ability to backtrace that all the way through the food supply chain and find out where a contaminant might have entered the system. If you find multiple elements, you can immediately see the crossover between those.

Using maybe rapid genotyping, you can actually tell if it's the same contaminant and therefore really lock down what's going on instead of having a three-month-long forensic investigation and dragging that out in the news cycle one could actually resolve this immediately [00:23:30] have recalls and acted immediately, have the recalls be able to interact with consumers even at the mobile phone level so that you could scan your food and say, "Is my item affected?"

At the wholesale retail level being able to scan that immediately and say, "Are there things on the shelves we need to pull?" All of those things are not that far out of reach. This is not science fiction. Our mission is to create a platform that connects researcher's practitioners, policymakers, essentially all of [00:24:00] the stakeholders in this enterprise to facilitate the development and application of existing and emerging smart technologies to global agri-food systems. This mission, this is from the IEEE perspective. Remember this initiative, we're looking for a way to partner with these outside agencies. We're being co-sponsored in our activities, for example, by [ASABE 00:24:22]. We're talking to other societies as well about getting involved in this. We're looking for ways to bridge these different areas.

[00:24:30] The vision is really to create an international community for promoting these technologies and their integration into agri-food systems

across the entire food supply chain. The initiative really is the application of technologies and innovations across the food supply chain from seed to fork. You can see a number of different areas that this might interact in. This engages many different IEEE technologies. [00:25:00] I'll say in a moment what IEEE so that you know what that ... As many of you probably have no idea what IEEE is. Many of you probably are IEEE members.

This engages many different technologies. IEEE, if you look at the tagline for IEEE, if you google that on the web, you'll see the tagline is Advancing Technology for Humanity. This is certainly well within that purview, well within the notion of advancing technology for humanity. The impacts can be everything from energy, water, fertilizer, [00:25:30] pesticide, efficiency, food safety. This is something that we say when we invent a new technology or develop a new technology for your iPhone or whatever smartphone you use, that can impact tens or hundreds of millions of people.

Well, if we do something in the food space, that can impact billions of people. That's a tremendous orders of magnitude more impact than many of the things we normally deal with. As I mentioned, this is a partnership between IEEE [00:26:00] and non-IEEE entities. What is this IEEE I keep talking about? This is a formerly known as the Institute of Electrical and Electronic Engineers. The purview of IEEE, the fields of interests have expanded well beyond that. It's really become quite a large organization. It's the largest professional scientific organization in the world.

This has over 420,000 members in over 160 countries, [00:26:30] more than 50% or outside of North America. There are 46 technical societies and councils, and each of those has a field of interest. Hopefully, you're not too serious about that. We have over 46 different areas with distinct fields of interest. There a number of other groups. There are local geographic groups, which have interests geographically around the world. There are standards, for example, the standards that you're using right now for your telecommunications [00:27:00] are all IEEE standards whether that's Wi-Fi or whether it's mobile communications. Those are all stewarded by IEEE.

Those should matter in this space too. If we want to have agri-food system technologies that can talk to each other, those standards will matter so that you can plug and play. Education activities are also very important, the big piece of this. Over 1800 conferences per year, 200 journals and magazines, four million document library, over eight million downloads per month. It's the most downloaded [00:27:30] document library in the world, the most cited document library in the world as well.

Over 1300 active standards, 500 more in development and partners up with over 1300 IEEE entities. Here's just a list of different technologies that might come to play in this area. This is not a comprehensive list by any means, just examples. I mentioned some earlier you could imagine smart packaging. We now [00:28:00] have the ability for less than $1 and pretty soon for less than a

few cents to do 3D printed smart sensors. These are printed essentially with inkjet-like technology. These sensors can be built into labeling. They can measure a small set of chemicals. For example, volatile missions that can detect food freshness, food safety.

Those are all things, which are not science fiction. Those are all things, which are well within reach within the next few years. These can be printed in thin films, done very cheaply. [00:28:30] You can see many different areas whether it's precision ag, whether it's monitoring of food processing equipment in real time rather than having a scheduled weekly teardown and clean out, instead being able to monitor pathogen buildup and actually act on it in real time, being able to monitor food kits that are delivered by Amazon through Whole Foods now. That will be very important. It will be a big driver of technology. People want to be able to scan their food kit with their cell phone and be able to detect is the fish the kind of fish it's supposed to be. Is it fresh? Is [00:29:00] it safe, et cetera.

Those are all going to be critical components going forward. In developing nations, you might imagine, for example, smart collars on livestock that transmit to the cloud information about the custody of that livestock, what it's being fed by taking microdroplets of blood on a periodic basis and transmitting that to the cloud in some encrypted fashion so that you now have a solid information about that livestock and its quality that changes its value dramatically on the world market by an order of magnitude.

[00:29:30] That's a game-changer for the quality of life of folks in those areas. You can see many other areas. Certainly, this is not just technology. This is ethics, policy, economics, and so forth. You can see we're considering both research and production tracks. Obviously, you can do something very different in research. We can have a graduate student that chases something around a field and keeps it running versus something that has to work in production for three months without interaction.

You can see also high production, low production for large farms versus [00:30:00] small intermediate entrepreneurship as an important piece of this. Many different stakeholders. Our roadmap is we're having a symposium and invitation-only symposium next month to develop the scope of this area. The idea is to understand where can we play. They're already vertical silos. For example, we heard about robotics this morning. There are vertical silos where there's deep research in robotics. There's vertical silos where there's deep research and plant biology, but they don't talk to each other that much.

The opportunity is how can [00:30:30] we bridge that gap, how can we support that conversation. We don't mean to assert the current silos in their academic research. What we mean do is actually get those groups together and bring them together with stakeholders that include, for example, practitioners, extension, NGOs and so forth who actually ... and translate the research out into the real world and have an impact. We want industry at the table because they're going to build the widgets. We want entrepreneurs at the table because

they're going to invent the widgets. These are all [00:31:00] key elements of it. We're going to develop a roadmap from this of how we can move forward.

The outcomes of the initiative include engaging many different groups. I'm not going to go through all the details here for the sake of time although I'm doing my best to catch us back up to our schedule. But we're really looking at the key elements of this being probably a series of new conferences and publications which are meant to bridge that gap between all of those stakeholders. That's really the direction we're going with [00:31:30] this.

The outcome of this symposium will be to help inform that. If you think you have strong input into that, I would definitely recommend you see me. I can get you an invitation. We still have some slots available. Not many. Hopefully, only one additional person from each institution would probably be a good limit, but we're really looking for people with broad sight who can understand how this is going to go in 5, 10, to 15 to 20 years. We really want to build something that's long-lasting [00:32:00] here.

You can see a few of the stats about the symposium and the folks who are involved in putting that on, include Renfu Lu who is the general chair of the symposium. He's the USDA-ARS joint employee with MSU. This is the organization of symposium not so crucial in this framework, but let me reiterate. Do get involved, volunteer, come talk to me. If you think you can contribute to this conversation, we'd love to have you on board. We really [00:32:30] want all different perspectives. We heard from economists. We heard from entrepreneurs. We heard from all different areas. They need to be at the table. We need to make sure that their interests are included in this consideration of what community we can build. Thank you. Questions?

Megan: Are there any questions? All right. Thank you. Next up, we have Janie Dubois [00:33:00] from University of Maryland Just down the street here.

Janie Dubois: Yes. It's actually cheaper to park here than our campus. Hi. My name is Janie Dubois. I'm the director of the International Food Safety Training Laboratory within the Joint Institute for Food Safety and Applied Nutrition, which is a part of the College of Agriculture and Natural Resources at the University of Maryland. It's quite funny [00:33:30] that I would be following a blue sky thinking organization because I really want to talk about the boots on the ground, dig maybe a little bit in the dirt of what's happening in our universities right now. I am not coming as a representative of my unit campus, college, myself elected as a representative of the non-tenure-track faculty across our universities.

Let me briefly introduce what we do. [00:34:00] Then, I'll use an example of our institution to hopefully highlight the missed opportunity that we have to use resources that have been built, put in place through other sources of funding for projects that would benefit agriculture and food. At JIFSAN, we are a partnership between the University of Maryland and the food and drug

administration that started in 1996. We deliver capacity-building programs [00:34:30] and perform research associated with risk analysis, good agricultural practices but never in the United States, good aquaculture practices, good fishing vessel practices, [HACCP 00:34:43] Quality Assurance for manufacturing of food, which represents percent of the manufacturing jobs in the United States, but we don't educate anyone in the United States.

SPS measures laboratory testing and food law. [00:35:00] All these programs came to educate largely foreign professionals on the requirements to ensure the safety of the food in the United States. Because we have this partial funding from FDA, the priority is the safety of the food in the United States. We also hope to promote the alignment of regulations, trade practices, and safety standards across the world. I'm an academic. I [00:35:30] could talk to you for hours with fascinating details about what my interests of research and even try to convince you that they should be your priorities.

But I'm quite happy with the current priorities of NIFA. We do have a good split of the food safety education and research when we look at the dollar amounts that are available. Unfortunately for us, none of it's available. What I would like to talk about is how [00:36:00] ... I would like to try to raise awareness about using soft-funded centers like ours for the NIFA education. I'm from Quebec. As the contest of accents goes, I say NIFA, education and research and the availability for non-tenure-track faculty.

We can start with an observation we all agree on. We don't have enough students in agriculture. We don't have enough students in [00:36:30] fields that will affect agriculture, food safety, and nutrition in the future. How can we attract young professionals? We keep being told bringing the technology. They like that. There are plenty of jobs. One of the things when I volunteer for our food science club at the University of Maryland, one of the things that they all go is I travel around the world all the time. If you are interested in an international career, agriculture [00:37:00] and food safety are it. Yet, we don't have students who come in with these kinds of understanding of the opportunities that are there.

In the context of our organization, my little laboratory has about $2 million worth of instrumentation. I had prepared slides. Then, I thought it was a little bit weird. I was going to just to roll 16 instruments worth between 100,000 and half a million [00:37:30] dollars on the screen and repeat that nobody from the community at the University of Maryland can use them. Nobody from the United States can use them because we receive no funding for them.

Then, how can we make these soft-funded centers who largely have non-tenure-track faculty? In our case, it's entirely non-tenure-track. How can we make them? A few months [00:38:00] ago, I guess earlier this year, we looked into the NIFA program and said, "Let's look into the research and extension experience for undergraduates program, which falls under the education and literacy initiative." We thought maybe that's a good way to get started. We

really have an opportunity here to teach students not only from our University. We thought good grant opportunity, let's look at that.

I want to go through what [00:38:30] the budgets look like when you're talking about non-tenure-track faculty. That's the reality that I think is escaping a lot of people. As it depends on where you find your numbers, but there's between 50 and 70% of us in the academic circles now that are non-tenure-track faculty. Three out of four new faculty, thank you, are non-tenure track.

We thought we'd open the lab, make this $2 [00:39:00] million worth of free equipment available. The grant is a maximum of $300,000 for four years. Do the math. Take the overhead out. We're a land grant, 10%, $68,000 a year. If we say we're going to do six hours per week for undergraduate students, we think we can fit 10 students, it doesn't really matter because we receive no revenue per-student. We're not a department. You need to staff [00:39:30] it. You need to do that in the laboratory.

We pay rent to the order of a $100,000 to the University of Maryland every year. I have to put $10,000 worth of rent on my grant proposal. If some of you are reviewers, ,well, I hope some of you are not because everybody went when I said that. $10,000 of rent. It costs me $85,000 to maintain those instruments every year. I'm going to put 10% of that on that grant. I'm going to have to use [00:40:00] some of the faculty that we have who are not paid by the state receipt ... actually raise their salaries, give it to the University of Maryland to bring it back to them plus overhead.

We thought let's include the number of universities in the area because if you're going to do it, it's better if it's a collaborative process. Of course, each of these faculty want maybe a month of their summer salaries. We're looking at some people who need to recuperate 100% [00:40:30] of whatever number of hours they're going to put in there. That is the non-tenure-track faculty. Then, the tenure-track faculty will get a part of their summer salary. Notice that I already discriminated against faculty that is non-tenure-track from any other universities because if we're going to afford ourselves, there's no way we can afford any of them.

It can't be non-tenure with non-tenure. What does that make [00:41:00] us the non-tenure track faculty? It makes this look like the postdocs on the project because a 100% of our salaries are put in there. We have that. We keep going. For the six hours a week two semesters, we're talking about $110,000 in costs per year. $300,000 funding. We're going to do that for two years. We've only accounted for six hours a week for our faculty. [00:41:30] We forgot we're going to have to manage this project if we actually get the money. Can we put more money there so that faculty who receives no management support will also be able to manage the projects?

You can see that, now, our option is we can put it for two years only. I would like to see the reaction in the panel of reviewers when they see 20 students

$300,000 a year. That's [00:42:00] not viable. Let's not do that. Let's leave the $2 million worth of instruments sitting. It's easier. That's the reality. I'm at my two-minute mark. I'm not complaining. We've been finding money. We're still alive. We only fire people every once in a while.

The last point I would like to make is not only [00:42:30] do we look weird on grant applications, not only can we not apply for a lot of the grants because they do not consider the costs of faculty who are not supported by their universities, but on top of that, it's very difficult. I'm not saying we can't. Where there's a will, there's a way. It's very difficult for us to volunteer. If we volunteer on anything, we have to do it after we found our salary, after we've [00:43:00] managed our project, after we've actually done the work for the project. We've tried to find money for next year and the year after if we hope to keep a job.

How do we volunteer to be a reviewer for grants or grant organization? Where do we find the money to pay our salaries to write a grant? As the non-tenure-track faculty is becoming the majority of the faculty, I think we have to look at these realities from [00:43:30] all different aspects from the aspects of the institutions and from the aspect of what does it mean for the granting agencies. What should they consider to be the appropriate distinction between these people and how does it matter when it comes to funding?

Should you discriminate between two different grant applications because of the cost when this cost is associated with the fact that the faculty applying is non-tenure-track. [00:44:00] My priority today to promote the advancement of research in agriculture and in food was to highlight the reality of non-tenure-track faculty and how we feel we're a little bit left behind in the grant process. Thank you. Any [00:44:30] questions?

Male: As an associate dean of research, I oversee about a dozen centers, which operate on soft money and much of what you describe, and I think the problem that you're addressing is a combination of a federal agency problem plus a university problem. NIFA is not unique in the nature of how this is viewed because your peer review, of course, often comes from academics. [00:45:00] The challenge here is in ...

Janie Dubois: And our non-tenure tracks not academics?

Male: No. It's not that. In fact, many of them participate in their reviews as well, but what they're told in the review cycle is to view this as in at least in part how is the student support and what you're pointing out is that's a real challenge because you're talking about unsubsidized research, research that flows through the tenure system in a department and to some extent tenure system processes [00:45:30] is subsidized by student tuition. You don't get that subsidy. In fact, I hope you get a preference overhead if they're charging you rent on facilities and so forth because, otherwise, that's really horrifying.

But anyway, I understand the problem, but I don't know that ...

Janie Dubois: [crosstalk 00:45:46].

Male: Yes. Absolutely. Anyway, I think many have a similar challenge.

Janie Dubois: I think it's very common next door, but I think it's just across the board. As we're talking about making all extension in some places making [00:46:00] all extension agents that are field offices non-tenure-track, what's that going to do?

Male: Right.

Janie Dubois: How is that going to change the function?

Male: I think I think one has to look at the budget model and the sustainability and understand what the federal agencies can and will support and understand that the university has to, if they want this to exist, has to make sure that they've made it designed it to be sustainable. I think that's the challenge.

Janie Dubois: Yeah, it is. It's a big challenge.

Male: Thank you.

Janie Dubois: Thank you.

Megan: Thank [00:46:30] you. Next up, we Casey Sclar from the National Initiative For Consumer Horticulture and the American Public Gardens Association.

Casey Sclar: Thank You, Megan. Thank you also to all the folks from NIFA, the National Institute of Food and Agriculture, who do so much for us and who are very hardworking [00:47:00] aspects of what we do in the USDA to make sure that everybody's fed and that our priorities for food and agriculture for the future are not only maintained but are prioritized, which is why I'm here today. Again, thank you for the listening sessions. I'm going to speak to you a little bit about who I am and the association that I represent first, the American Public Gardens Association. Then, I'm going to tell you a little bit about what I do in my service work, which is the national initiative for consumer horticulture and that I'll take the form of why we're addressing these [00:47:30] two questions today.

I do imitations very poorly. Therefore, I do many of them, but I was excluded from the Accent competition today on that basis. Getting right at the two questions in the first question, my priority that I put to you today is gardens. My association's vision is a world where public gardens are indispensable. We are indispensable centers where people and plants come together. [00:48:00] We are there to extend our information out to children, to adults, to anyone who engages with the form of agriculture that is nearest to you in this room at this

very moment. That is horticulture in the world around you right outside the door where I'm looking our plants.

It's unfortunate that they're not in here, but we'd like to change that. We'd like to change the way that you view things and change the way that you interact with agriculture because feeding the world is a huge challenge. It takes many different things. [00:48:30] It takes all different forms of awareness. Who is the American Public Gardens Association? What do we do and how do we enter into this conversation? Very simply, we're over 620 organizations spread throughout the USA, Canada, Mexico and about 20 other countries.

We are public gardens, botanic gardens, our Berita green spaces. We have some cemeteries and zoos that are members. All of them are dedicated to making the world a better place through people and the plants that we represent. [00:49:00] We have 9300 individuals who work or engage with these including over 100 corporate members. Collectively, we account for about $2.3 billion in annual operating revenue. That's actually going to pale in comparison to some figures that I'll show you a little bit later on.

What does my association do for them? We provide best practices. We benchmark. We're sure where we are in the economics. We do publications. We have only over 20 professional sections where everyone from finance and operations to marketing [00:49:30] and communications to horticulture greenhouses and facilities and plant conservation and plant nomenclature and taxonomy come together.

We are places that fuse functional beauty, iconic treasures and all forms of landscapes so whether it's a nice functional landscape that has a [inaudible 00:49:53] exhibit for art where people can make the connections in the art and science of horticulture to places where people [00:50:00] can learn about pollinator-friendly plants or make connections that last a lifetime or safeguard the plant genetic resources that we have and/or interpret them. We receive over a hundred and 121 million visitors a year to our gardens.

That's almost as much as every major professional sport combined, NHL, NBA, Major League Baseball, my own beloved Philadelphia Eagles and entire [00:50:30] NFL. Thanks to HDTV attendance that those sporting events is declining, but you can't see a garden or experience the natural world around you on TV in the same way you can in person. Our attendance is rising 5 to 10% a year where people go to make connections with plants. That's why we're here to help you today.

We have sites of active learning. We're over 1-1/2 kids primarily [00:51:00] in K through five audiences, but also over 550,000 adults include over 200 million educational impacts a year with our members. We'd love to make that a whole bunch more. Primarily, it goes until they're in grade six. Then, something happens. That, if we're going to educate kids, is where we need to head is into middle school and high school audiences. We'll talk about that in a little bit.

[00:51:30] But where we think we can have the biggest impact, and this translates into my service work with the national initiative for consumer horticulture, is getting people aligned in the cultivation use and enjoyment of plants, gardens, and related horticultural services. How many of you in this audience have houseplants? Raise your hand? Just about everybody. How many of you interact with landscapes? Just about everybody. Should [00:52:00] be everybody. How much NIFA funding is going toward that at the present time?

Well, let's explore that. Home community gardens have 80% of US households participating in gardening. We'd like to move that value to 90%. Still, only eight of 10 people. There are over 40 million acres of lawn in the United States of America. It's the largest irrigated crop in the United States. [00:52:30] Frankly, ladies and gentlemen, there's too much of it. How do we get people gardening more? How do we get people interrelated with food? How do we get people interrelated more with forms of native, sustainable, and adaptable plants in the environment around them that can safeguard our crop genetic resources and make a distinct connection? How do we make it so that junior senators from Kentucky are not assaulted when they decide to practice practical horticulture?

[00:53:00] Enter the national initiative for consumer horticulture. We are a coalition of folks that come to you today that are not just public sector employees from government institutions and centers of learning in both land-grant and non land-grant colleges. We are also a group of industry professionals from private industry representing the retail garden centers, landscape, services and other related traits as well as [00:53:30] non-profits like myself who represent both trade and other aspects of industry and the greater world of gardeners and gardening.

Together, we hope to create a unified voice. We hope to promote the value of plants to everyone including that person in the produce aisle who has no idea about what you do for a living. Outside of this room, the nine out of 10 people have absolutely no idea. When I say germplasm, they recoil. We need to change that, [00:54:00] but we want to make you aware that our collective industry, our diverse industry of professionals from arboriculture to the landscape services trade to turf management to retail and nursery environments and public gardens all account for $196 billion a year of economic impact and over 2 million jobs. Here's the so-what for you.

We represent all that industry. We represent all that economic impact. Currently, we're getting a fraction of the [00:54:30] NU's NIFA funding that's being dedicated to that outreach and communication that needs to happen so that all the great work that you do is recognized and people make a better connection with where their food comes from and why that's important. You don't believe me and you say, "Well, he just pulled these numbers up. We have an economic committee from the national initiative of consumer horticulture that put all this together to save trees." I didn't bring any copies of this today, but if you go on our website at consumerhort.org, [00:55:00] you can see or just do a search on #plants. Do that.

It documents the $196 billion-a-year impact with folks from Texas A&M and other nationwide notable ag economist and other extension and nursery personnel with refereed publications references throughout. Please. I don't just have one. I've got six top priorities for you to think about in the two minutes that I have remaining. First of all, a [00:55:30] lot of urban space right now has invasive plants that are making it up and is unproductive resource. Those resources, we need to put more effort into rehabilitating those urban landscapes that can often be very productive for agroecology, which has already been mentioned today as a priority and for the health of the urban forest to resist invaders.

Plant biosecurity, it's also a conversation on [00:56:00] urban agriculture but not just for urban agriculture because food systems and food security and people knowing where their food comes from and how to grow that food and also making greater impacts into food nutrition as a result of that is very important. Then, also gene conservation. Now, everybody's heard of the black box vault that's the doomsday seed vault, but nobody knows that the national plant germplasm repository in Fort Collins, [00:56:30] Colorado safeguards our crop genetic resources.

Again, outside this room, you use that term and people's eyes glaze over. Let's call it the Armageddon resistance keeper or something else and prioritize the funding for that. We are the recipients of a [inaudible 00:56:46] grant with NIFA. We're very thankful for it where we work with our partners in the Tri-Societies, the Crop Science Society, Soil Science Society of America. We're getting the word out there about crop wild relatives and using ag research and bringing it to our public gardens [00:57:00] to talk about that, but also 80% of those crop wild relatives are located near you and me in highly urbanized environments.

The parents of blueberry, cranberry also need to be prioritized, conserved, and saved and can be. Anybody can do this. This is easy citizen science. Wouldn't you like to go look for crop wild relatives? Sounds exciting. Climate mitigation and adaptation principles, also the profession of horticulture and landscape horticulture and gardening [00:57:30] needs to be honored and valued as well. Some occupational techniques. Then, as you've heard today, we were partners with Seed Your Future, another nonprofit that promotes career choices and promotes horticulture as a career choice.

I leave to you that consumer horticulture is multifaceted but largely unexplored and would encourage you to consider that through one of our programs or one of the many other programs through the National Initiative For Consumer Horticulture that relate to operational [00:58:00] sustainability and our public art and sustainability index, global strategies as well as the North American strategy for plant conservation of rare, threatened, and endangered plant resources including those crop wild relatives, the million pollinator garden challenge, and programs that promote pollinators including over 50 nonprofits and other federal government partners and issues of invasive species as we seek

to reclaim the urban forest and promote biodiversity [00:58:30] in it as well as multifunctional ecosystems. Thank you.

Megan: We've got a question. One moment.

Male: It's really not a question, maybe more of a comment than a question. First, I don't know what the number was, something billion acres of turf research and turf science is really critical to future landscapes. I think that's an important piece. [00:59:00] I would just harken back to consumer preference to have lawns. We may know scientifically that they're not a great idea, but consumers want to have a lawn. That lawn space is critical as well as the horticultural space around it.

I guess my comment to NIFA is, too often, when we hear talk about One Health, One Health is animal health and human health, but the environmental health and particularly in the built environment is critical to the success of that one health promotion. [00:59:30] I just don't see it and hear it enough to sort of see it rolled into these answers and, quite frankly, I think NIFA would have to spend more time thinking about how do we make that conversation happen on either university campuses or among these kinds of non ... in a private sector and public sector partners. There's real opportunity there, but most of the talk is happening between human health experts, animal health experts and the built environment.

The environmental health piece is just being left out particularly around the built [01:00:00] environment. I would encourage NIFA to think through how does that work, where are the right places to make that happen. Again, my own personal expertise and my existence in the northeast, this is where the built environment is really critical and where people are ... How do we re-sustain some of those downtown environments. I think urban forestry is a great comment. The horticultural surroundings in urban environments are critical. Parks are critical. Thanks for bringing these [01:00:30] up.

But I also think for NIFA, this is something that has to happen at the one health level where environmental health doesn't get pulled out separately. Thanks.

Casey Sclar: [crosstalk 01:00:39] coming back. First of all, thank you very much for bringing that up. I want to make clear that I'm not for eliminating turf. I'm not a lawn keg killer. We're making that turf that's their work for us better and for making better choices for the homeowner in that realm so that they're reducing the amount of fertilizer, reducing the amount of pesticides, [01:01:00] having a better experience and a more satisfying experience with that lawn.

I cannot overemphasize my agreement with the rest of your comments as well that we need to connect with people where they are and make relevant what we do with them because the work that we all do is extremely important, but often times, it goes unrecognized and unappreciated by those who aren't

college educated, haven't had the experience. These are folks that are extremely [01:01:30] hard-working. We can transform their world with some simple information and also a lot of economic opportunity particularly occupationally because our careers in the environmental and built world are hugely rewarding and satisfying and often are going under-compensated. Thank you.

Megan: Thank you. We are going to advance to our post-lunch schedule [01:02:00] because we'll still take lunch at about noon. Is Glenda Humastan here? How about Bo Zhang? Why don't you come on up from the Virginia Polytechnical Institute and State University, Virginia Tech.

Bo Zhang: [01:02:30] Good morning, everybody. I'm glad to speak in front of ... I mean like in the morning instead in the afternoon. My name is Bo Zhang from Virginia Tech. Two weeks ago, I took my son to sell popcorn for her cub scout before the football game. We were selling popcorn at a parking lot. Then, we met one father and one daughter and they introduced themselves. [01:03:00] Yearly, the people were like customers they do not introduce themselves. I introduced myself to them too. I said my name is Bo. They said, "Oh, our cat's name is Bo." I said, "Yeah. I know there's a famous dog named Bo too."

I'm the Virginia representative of National Association of Plant Breeders. Today's topic is to support public plant breeding. I'm [01:03:30] assistant professor at Soybean Breeding Lead so I'm a soybean breeder. I had a three-year experience in industry, two-year experience at [inaudible 01:03:39] School, Virginia University and now I'm having like almost five years experience at Virginia Tech as a land-grant university.

Our mission of NAPB Association is to strengthen plant breeding to promote food security, the quality of life in a sustainable [01:04:00] future. Our vision is to help create the future in which strong public and private breeders work closely together and independently to release ... deliver varieties and advanced germplasm for the society.

The value and importance of plant breeding to food security, quality of life, and sustainable agriculture system of future to be learned and recognized and appreciated by [01:04:30] the public. That's our mission and vision. What we do, as a plant breeders, we develop varieties, adapted to the environment. From now on, you will hear a lot of stories because I'm a soybean breeder.

The map here, you see the different colors as with different letters. Every session is one [inaudible 01:04:53] group of soybean varieties. In Maryland and Virginia, we grow three, [01:05:00] four, five, maturity group soybeans. If we grow maturity group 00 and one varieties to this area, we will see short plans early maturity. We don't have much yield. If you grow but you do group six or seven varieties into these two states, you will see before the first frost comes, you'll still see the green plants, they're not ready to harvest. You have no yield at all.

Our goal is to create varieties adapt to the environments. [01:05:30] That's why most states have their plant breeders. We're also meeting needs from the companies, farmers and then end-users. I have a [inaudible 01:05:40. The first one is improved nutrition. I know Dr. Brewster, you like to hear this because we recently received funding from a United Soybean Board Aquaculture Program. It's a little bit money to support a [inaudible 01:05:56] trial because soybean meal has been used in [01:06:00] aquaculture meal to fish industry, but all this aquaculture at most cannot ... I'll only eat soybean meal because soybean has anti-nutritional factors.

Soybean meal has been blended into the fish meal like sweet meal to feed the fish and shrimp. However, the inclusion rate like percentage that can be blended into the fish meal is free like 20, 30%. With our new varieties, with [01:06:30] low anti-nutritional factors, high sucrose to providing higher energy and high protein content to make more protein meal, meal protein so our hypothesis of this grant, this project is to use our particular designed soybean variety to make soybean meal to try to increase the inclusion rate of the soybean meal into the aquaculture meal.

We'll reduce the cost of the fish [01:07:00] meal. This picture is pretty hard to see, but it's a shrimp is eating the soybean meal pellets in his mouth. Another example to meet the requirements of the farmers and users due to enlarge genetic advances. For soybean, all this soybean cultivars, germplasm in the United States, I believe, is only from 20 assessors. You can imagine all [01:07:30] these varieties, commercial varieties. There are siblings or cousins. Genetic base is very, very narrow.

A few years ago, we were in kind of funding by a USDA foreign agricultural service. It's a certificate research and scientific exchange program so visit China, several institutions and several universities. We had to start like exchange information, [01:08:00] but there's no any funding or any program to support the following up collaboration like really exchange people like scholars and students and exchange the germplasm. It's clearly started there. Then, it's nothing for follow-up. I have to move up quickly.

We also need like USDA [inaudible 01:08:21]. We also need stakeholder involvement. We need a mechanisms for engagement from farmers and users and seed companies from all scales [01:08:30] and all regions including large, medium, small-scale farmers to set up our needs and their needs and our priorities and their and our opportunities. Here is a dynamic concept we work a few years ago to proposal, but on most of the breeding projects, we have followed the same concept.

We have research and education, including teaching and the extension and to contribute to system of agriculture. [01:09:00] As a breeder, we have classical breeding. We have the molecular techniques in employing into the breeding scheme. Then, we also have the quality control from food scientists to control the quality of the bees, the nutrition and flavor. We also need to find a varieties

adapt to this environment. From all of this which mean the breeds with interdisciplinary sizes

Our [01:09:30] breeding program has a long-term collaboration with the private industry. In Tom Tolliver, here's the owner of the private company, private forum actually called [inaudible 01:09:41] farm. He took me to Japan this summer this year because [inaudible 01:09:46] farm license of our [inaudible 01:09:49] soybean varieties for natto is the Japanese food and the tofu.

We visit the natto and tofu manufactures while we're in Japan. I had the opportunity to listen to what they want, [01:10:00] what their concerns of our current varieties and what their need for our future varieties. Also, with the feedback with Tom Tolliver. I know what the farmers need were like a producer, exporter need from our varieties. I modified my breeding objectives slightly. I know what they need. That's what I'm working for.

We also need long-term grants. Here is a breeding scheme for soybean. The first year making classes and seventh year, we finished [01:10:30] our own stations. Then, we also have varieties leading into enter into the regional task including USDA uniform tests in the state of writing and testing. A story in China said a person had to study 10 years before he entered exam, but for soybeans, I need to have we say 10 years to [inaudible 01:10:53] to release a variety. Here, the sample because I'm working on this proposal now [01:11:00] is the USDA-NIFA Specialty Crop Research Initiative.

For SRPE and CAP program is so up to four years. The first priority, the focus area is plant breeding. You can see four or five years were from crossing to here. Then, we'll have to need another five years to finish all this, but we're not asking you finance like 10 years, but we want to ask five with renewable option. [01:11:30] The most promising opportunities. Plant breeding in interdisciplinary sciences. I collaborate actively like heavily with extension specialists for scientists and in other fields too.

Field-based breeding equipped with the emerging technologies is what we want to ask an effort to finance. This is not only my voice. It's all the voice from my association. We have the common e answers. Then, we choose to what to predict. [01:12:00] Breeder's field experience is very important. My colleague, [Adel Al-Kharafi 01:12:05], he is a very famous wheat small green barley breeder at Virginia Tech. He always says, "Oh, I'm a dinosaur." Actually, he's no dinosaur. We do not need dinosaur now, but we need to have a field-based operators with tons of experience.

Breeder Animal Center talked to me. He said, "Oh, he has been working for animal center for 20-plus years." He set up. The company has spent a lot of money on the [01:12:30] genotyping and then selected 6000 [inaudible 01:12:33] already. Those projects were in the [inaudible 01:12:39]. His boss asked him to go there to select video selection and like how many [inaudible 01:12:44] He looked at all these project [inaudible 01:12:48]. He select only two.

His boss were really mad, he said, because they spent too much money, too much time on this project.

They thought is like a genius [inaudible 01:12:56] group. Then, the boss said another breeder down [01:13:00] there to select [inaudible 01:13:02]. That breeder is like the same. The story tells us we still need the field-based plant breeders like we experienced in the field. I haven't heard anybody in our story in breeding communication community who do not believe of breeder selection. I was at the [inaudible 01:13:19] station yesterday like carry umbrella, taking the notes because I want to see every single plot of what they look like in the field before we harvest them.

Field [01:13:30] experience is important. Now, we see how high throughput genotyping. My understanding of the highest throughput is faster and save a lot of time and without or with minor mistakes so more accurate and much faster. For soybeans, we do have the availability of the snip data for all these planning sessions most of them collected by the USDA germplasm.

[01:14:00] There's ongoing sequencing, more soybean germplasm too including their [inaudible 01:14:06]. I'm not going to talk about this picture here, but there's a use of all this genotypic data. The highest throughput phenotyping, so personally I do believe the robots will replace human one day, but I also believe the plant breeding job will be slowly replaced by robot. Georgia robot's revolutioning [01:14:30] the plant breeding. Another story. My neighbor saw a drone was flying in the neighborhood and watching every single window of his neighbor.

Then, the drone flew into the garage and a few minutes later, the drone came out. Drone is present slow now. He's popular in people's life. We also see drone working in agriculture field too. This picture is about canopy coverage of soybean plants. You can measure the canopy coverage [01:15:00] development. It's a faster canopy like rapid canopy coverage of a soybean plants will predict a higher yield.

Another one is the robot because robot is a popular topic. I copy this picture from nature.com. I also see the video of the how the robots works in the agricultural field. The robot's moving into the field and then use arms to measure the diameter of the corn plant. Then, finish and move [01:15:30] to another plant. It's like this.

Carry because robots do not make errors, do not mistakes. They do not what tired of means to them so no human mystics. The benefit on enhanced plant breeding quickly go through this, my slide. Thank you. bender Fredonia has prorating quickly goes to reduce molasses I'd. The benefit of first one would be the better cattle resolution of environments to enhance selections, efficiency, and effectiveness [01:16:00] for target environment because the climate is really changing. We need to target environments.

Incorporations of new and intensive phenotype data with genotype data to further understand and select target traits, those target traits are selected by the end users, the farmers and C companies. Trained students will be engaged in interdisciplinary sciences. Some of my students working with ag [inaudible 01:16:22] faculty working with food scientists. They are involving other discipline sciences.

They will have a better [01:16:30] idea what the idea of their future career with the genetically and [inaudible 01:16:35] background. Then, they know what do you want to do. It's the last slide. Please, support public plant breeders. Thank you.

Megan: Any quick comments or questions? All right. Thank you. Next up, we have Stacey [01:17:00] McCullough from the University of Arkansas, Division of Agriculture and Cooperative Extension Service. Thank you.

Stacey McCullough: I want to thank you all for allowing us this opportunity. I'm wearing two hats today. One of my hats is as the assistant director for Community and Economic Development at the University of Arkansas Division of Agriculture Cooperative [01:17:30] Extension Service. The other is on behalf of my colleagues that are part of the Southern Region Community and Economic Development Program leaders. I happen to be in DC this week. When they found out, they decided to put me on the spot and send me up here. I'm going to do my best to represent both of those things.

I want to say that I also am a product of 4H, so several people have mentioned that in their remarks. It's one of the things that's enabled me who's really an introvert to come out of my shell and be able to take [01:18:00] risks and really get out there and do the things that I do as a part of my job, so a real credit to that. That's an important part of what we do with an extension. Now, I see why everybody else was confused by this little clicker.

But one of the things that in 4H you learn is life skills. One of the things I've learned over time is if you don't want people staring at you when you're at a podium, have something else for them to look at. That's the main reason I have these slides here, but I also think they'll help tell the story of what we're [01:18:30] trying to get across.

I come from Arkansas. It's a very rural state. It's a very agricultural bay state. We produce a lot of food for a relatively small state. I put in a few statistics here. 42% of our land is in farms, 43,-000 farms on 13.7 million acres. We do a lot of ag exports. We're in the top 10 in a number of exports from our country's perspective. When you look at our [01:19:00] GDP overall, we ranked 35th in the country, but when you just look at the share of GDP generated by ag, forestry and fishing, that number jumps up to eight. Obviously, that's a big part of who we are as a state.

A lot of our farm families and companies and ag industries that have built upon that when you think Tysons in some of those other countries, they all are based upon this agricultural sector. Let's [01:19:30] see. Here we go. This is just some information about the importance of ag to our state in our lives. One out of six jobs in our state comes from agriculture of some level. It counts for 8$.99 billion in wages, a lot of labor income and value added to our state. If you remember my title slide, I talked about community and economic development. Why am I not here talking about ag and food?

Part of that is because to have a strong ag and food [01:20:00] system, you need strong communities. You need strong and diversified economies. If your economy is only based on agriculture, you as a state, you as a community are going to suffer. That's the role that we play in my field. I will say that I almost missed this opportunity because when I saw the questions, and this is logic, should have thought a little bit harder, the questions were framed around food and agriculture and [inaudible 01:20:27] community and economic development. But again, these things are interrelated. [01:20:30] That's the message that we tell people across our state when we're working with rural communities and even urban communities. We talked about the importance of strong communities and strong economic base to support these industries. It really is important.

Here's the other reason why. This is just a quick map. We're just going to quickly go through these visuals. This is what my state looks like. The red counties are what we consider urban. Now, if you're from this part [01:21:00] of the country, that's probably not urban in your world, but I live in Little Rock, a population of about 200,000 people, but in our state, this is what we call urban. The blue, the yellow, and the green states are what we can consider our rural counties. We divide that into the delta, which is where a lot of our row crop agriculture, a lot of our export markets come from.

The green is what we consider the highlands and the coastal plains. We do still have row crop in some of those regions as well, [01:21:30] but there's also a heavier emphasis on animal agriculture as you look at those regions. Keep this picture in mind as I quickly brush through the next few slides. This is really again showing why it's important to have community and economic development part of the portfolio that we're looking at when we think about the land-grant system, when we think about our research, our education, our teaching, and our extension outreach. This is important.

This is population change in our state from 2010 to 2015. [01:22:00] The white and pale green are counties that have declined in population. The darker greens are the ones where that is increasing. You can see the distribution of that. Urban area is obviously growing just like many, many other states much faster. They're not experiencing the same levels of population loss that we see in our rural areas. This is total employment change. The graph on your left is 2007 to 2015, [01:22:30] but I also included 2010 to 2015 to take away some of the Great Recession effects. You can see again the lighter colored counties are the

things that are having negative impacts in employment. The darker colors are having positive growth.

This is the change in median household income from 2010 to 2014, same color schematic. A little bit different here. You don't necessarily see the same rural-urban divides. [01:23:00] It's much more sporadic. There's lots of reasons for that, but we won't have time to talk about that today. These are the poverty rates. This one I want you to think about in reverse. The darker the color, the higher the poverty rate in our state.

Keep in mind that even the white areas is still 9 to 29% poverty, so poor state for sure. We want to change that. Food insecurity, several people have talked about that. This [01:23:30] is the percentage of children with food insecurity. Again, the darker areas in this particular slide mean higher levels of food insecurity. Keep in mind, we grow a lot of agriculture, so interesting. This is health outcomes. Here, kind of the same story. The lighter colors actually in graph mean that those are lower-ranking in terms of levels [01:24:00] of health within our state.

Again, this covers a broad spectrum, but these are basic building blocks that impact the quality of life for the people that grow the food and agriculture in our state, the people that rely on that. These are things that we're trying to address with our programs. How can NIFA and Land-Grant University system address these challenges? We have a great partnership right now. This is a summary of how that partnership is working currently. Community vitality is [01:24:30] a part of NIFA's portfolio. It's housed in the division of family and consumer sciences. Brent Elrod is our national program leader.

He's been a real partner for us since he's come on board. He regularly reaches out to us through program leaders, through our professional associations, neck depth our friend Edie butchered earlier and even one-on-one, he encourages us to come to his office when we're in DC, actually stopped by yesterday to visit with him, so been a great resource for us.

One of the things [01:25:00] that he's been champing for us is multi-agency collaboration. This is really, really important because one entity we know this basic 101 community develop. One entity can't do it all. You need partnerships. You need systems. He's been instrumental in helping to identify partners both within USDA other divisions as well as partners throughout the federal government that have helped us to think differently about how we approach our problems and how we think about the resources that are out there for [01:25:30] us.

The NIFA also supports us through the regional rural development centers and, obviously, through the capacity and competitive funding. One thing I will say about, and these are both important, there's been a lot of discussion about those. The competitive funding is really the area that allows us to be more innovative in the things that we do. We have a set of things that our state and

local stakeholders want from us, but as we see emerging issues or there's a new area of potential [01:26:00] research that offers some opportunities thinking about how we can do that, the competitive funding model is what we rely on to do that.

As an example, obviously, AFRI's competitive foundational program is the broad base that has lots of programs and has a little more flexibilities than some of the other grant programs. This just shows the breakout. The orange level, about 12%, is where people in my field get most of their grant funding. That's subdivided [01:26:30] into about five different categories. Three of those relate to more to agricultural economics. Then, one of them in particular entrepreneurship for communities is one of the ones that we rely on heavily. Competition for that funding has obviously been going up. I think we had 53 applications from 30-something last year.

Definitely an interest in that. When you ask a bunch of program leaders from 30 institutions to identify one priority topic [01:27:00] to share with NIFA, this is what you get. There is no one topic. I would tell you that the strategy has been we had a big video conference call. We've been communicating by email. These are some of the major issues that we are seeing that we are getting. We see opportunities in. We're getting demand for research and education in. You'll be seeing as you read the written comments some themes arising. Hopefully, you're using very good qualitative research [01:27:30] methodologies and software to analyze these things because I think some of these will definitely come to the top, but this is the laundry list.

Obviously, they cross between teaching extension and research. One thing I will say about the research, I live in a state where Dicamba is a big deal. Science is under attack from all different fronts. The more you can apply that science, the better that people are going to respect that science and listen to that science. That's one of the things that's very important to me. In my state, [01:28:00] broadband access is a big problem. Recently, Purdue came about with a what do they call it, a broadband divide or digital divide index. That's helping me tell the story about why it's important, why people need to be thinking about broadband and how it can enhance their lives because part of the problem is people don't see the value in it. That's where that translates and overlaps. I'm getting nervous.

The other part of the message I want to tell with you is there are strategies that are important [01:28:30] to this. As you think about developing your RFAs for funding opportunities, I'd like you to think about these types of strategies and encouraging us to follow these because in community development, we know that these are effective, we've seen it. We see it every day in our work. The piece that I would like to really highlight is the youth engagement. Youth are part of that solution. Too often, we forget to include them in that solution. We definitely want to make sure that happens.

I will [01:29:00] first of all say thank you for listening. We appreciate that opportunity and really highlight once again that it's not so much the profile of things or the very specific topics, but remembering that community economic development is really key to the future of our country, the future of our world. I'd encourage you to continue to sport that as best you can. I know you're 1.5 billion sounds like a lot of money, but when you slice it up among all these people, then it'd go very far, but we would definitely appreciate your continued [01:29:30] support in this area because it is important. Thank you.

Megan: Any questions for Stacey?

Male: Sorry to repeatedly be the dumb guy in the room. I have maybe a comment more than a question, but I'm glad to see that you involved other stakeholders than just the researchers in this because I think [01:30:00] ... Let's remember that the mission of NIFA isn't exactly ... It is in some ways community development, but it is an exactly community development for its own sake. It's for the agri-food systems benefit, but nevertheless, the fact that you engage stakeholders in this in a way that contributes to that mission, I think, is very important and I hope enables NIFA to go out and get funding to support this from other agencies who also have a stake in that domain. I think that's [01:30:30] maybe the best opportunity to leverage that 1.5 billion.

Stacey McCullough: In response to that, one of the … There were several factors that led me to come here, and one of them was we have an agricultural leadership program called [LIDAR 01:30:44]. We've been doing it for about 35 years now. We have 450 graduates. It's a two-year program. I'm new to this position. Part of my job was to go and just meet these people. I'm not part of the history. I haven't been there when they've been there. Many, many, [01:31:00] many of them have said this is the most important program that extension is offering us.

I'm a farmer. I rely on the research. I rely on my county ag agent, but this helped me understand how I can be part of making sure that system is strong from a policy perspective, how I could educate those around me, how I can observe the perceptions of those around me and be part of the solution and having that dialogue and finding new ways of continuing to supply food to not only the state of Arkansas [01:31:30] but the world. It's definitely right. That lens is very, very important. I understand if I can't just support it to support it, but it is a critical component to that.

Male: Thank you.

Megan: All right. Well, thanks to everyone that spoke this morning. We're going to break for lunch now. I encourage you not to go too far because we would really like everyone to come back after lunch at one o'clock to listen to our afternoon speakers. [01:32:00] Also, there are probably going to be some unscheduled speakers that speak as well. Please, come back and participate in our listening session. Speak if you can. If you're interested, we are willing and ready to listen.

Megan Haidet: Thank you for returning for our afternoon session of NIFA Listens, Investing in Science to Transform Lives. My name is Megan Haidet. I am moderating this afternoon session and up first we have Dr. Glenda Humiston from the Agricultural and Natural Resources Program at the University of California.

Glenda Humiston: [00:00:30] Thank you. It is a pleasure to be able to be here today. I'm glad I was in Washington DC this week. We've got APLU starting up in a day or so. The timing was really excellent. I see a couple other people who are probably here for the same reasons. I want to just focus a little bit today not so much on what I think you've heard a lot of because I can't help but imagine and having skimmed some of the earlier sessions there's been a lot of individuals talking about fund my discipline like fund water, [00:01:00] fund nutrition, fund forestry, fund this out and the other.

I'm sure you could sum all of that up more or less as we must make sure food is available. The supply is stable and food itself is a reliable source of nutrients. We need to increase yields while maintaining environmental sustainability, develop plant and animal varieties that can adapt to changing environments, and research systems where soil can naturally act to remove waste and pollutants and provide incentives to growers to decrease [00:01:30] greenhouse gas emissions by managing soil health.

We must find ways to decrease food waste by creating more efficient system for distribution as well as put more focus on the farm to fork supply chain to increase trade jobs and economic growth. From the western states, of course, we have to highlight the fact that protection and management of our environments, a big issue is water. Particularly, how we manage water resources in our snow-fed systems, which is quite different than the rain-fed [00:02:00] systems of much of the nation.

Groundwater recharge, safe aquatic systems, water quality et cetera, and how that ties into productive AG as well as urban environments. Also, out in the West, we're dealing, of course, with wildfires right now. That's certainly been in the media. Forest and range health are key characteristics of living in the western states as well as how we manage fire. Communities need to better understand and address serious issues that are not faced in many other states that we do face in the [00:02:30] West that are critical, it can literally mean the difference between life and death in many situations.

All of these are extremely important issues and they're issues we, at the University of California work on as well. I have to say I can't envy the folks that have to process all of the inputs you've got so far and try to sort it out and figure what priorities we're going to move on, but I'd like to just take a few moments to suggest a slightly different approach as we move forward too that ties a lot of these together. [00:03:00] I'm hoping that green arrow is the one. Just real quickly, we're probably typical of a lot of systems although we do have 10

campuses rather than 1 in addition to offices in all of our counties, our AG Experiment Station, and research extension centers scattered all over the state. 10 of them currently, but we're actually looking to increase that with a few additional ones soon.

Of course, we have our statewide programs, and I've actually split those out because one of the things [00:03:30] we're really putting a lot of focus on is how to start expanding use of volunteers in not just our traditional statewide programs like 4-H and master gardeners, master food preservers is a fairly recent one for us, and our California Naturalist, which many other states have a Master Naturalist Program, but the others as well are key and we're trying to actually find out how all of these can start finding synergies and leveraging each other's resources in some creative ways.

When you sum it up, I think this one slide [00:04:00] is one I use a lot to show the history of what I think most of us do regardless of the crop. You could have almost the same slide for corn or grazing or apples or whatever. We've got research happening out there. We get a new product such as our tangos. That's something we actually have a patent on.

One of the things we like to take a lot of pride in at the University of California, my division A&R. We're less than 1% of the UC overall budget and yet we file 4% [00:04:30] of the patents and every year when you see the end tally of the top revenue-producing patents, we're usually about half of those. Something that folks forget a lot. I have to remind them all the time, but tango was a very popular one. Consumptions increasing, use of land is increasing. It's just been a great success story and yet not without its challenges.

I tell folks in California, I used to joke that we had a new bug every month and I'm told I'm wrong. It's actually every six weeks, but, hey, whatever, [00:05:00] six weeks, a month, we get a new bug pretty frequently. They usually do a lot of damage. This particular one, Asian citrus psyllid, has created a lot of trouble. We've tried a lot of things with controlling vector, we're finding parasites for it, and now actually a new thing we're doing with our citizen science is an interactive detection map where we can harness citizens to help us watch vectors and control them and identify them much quicker.

This is pretty typical of what we do, but what I want to suggest is that moving [00:05:30] forward we really have to start thinking about some transformative innovation. Some really new ways of doing it, doing our research and actually getting it towards implementation into our extension system. Moving beyond just improving existing methods and processes to completely rethinking systems development. One new strategy is to look at collaborative efforts between experts in say soil sciences, plant pathology, biochemistry, etymology, and other fields of scientists combined with [00:06:00] technology experts in robotics, sensors, artificial intelligence, materials, supply chain logistics, energy systems.

Doing this in a way that we're really looking at not just todays but tomorrow's very complex problems in Ag. I want to just highlight a few of the things we're trying to do in California along this line. I'm not claiming they're perfect, some of them are still somewhat fledgling. We're having some bumps in the road as we implement them, but for [AFRI 00:06:29] and for NIFA [00:06:30] and [inaudible 00:06:31] and frankly any of the funding type sources, which is part of what this discussion is about.

I think we really need to look and make sure this type of funding of research facilitates this kind of systems work. Real quickly, let me run through a couple. This is one that where we're really partnering up with a lot of different partners to improve both our delivery as well as our research on sustainability. Particularly, around soil health and things like conservation tillage.

It's very exciting. [00:07:00] We just signed this in May. We're still working out details, but so far everybody's excited to be engaged and actually we just signed an agreement with USDA NRCS. They're going to fund half the salary of two cooperative extension advisors out in the field on agronomy. This is very exciting for us. We hope if it works out well we'll be doing more of that.

Another thing is our Central Valley AG plus. 28 counties really putting together a holistic [00:07:30] strategy around making this food and beverage manufacturing system happen. If it happens we're talking 40 to 50,000 jobs. New very good paying jobs in this arena tied to not just better logistics and more manufacturing entrepreneurship opportunities, but via research things like we're looking to try to get food processing down to net zero use of water.

We actually have a facility, the Mondavi Center at UC Davis that is very close to that. They're reusing water [00:08:00] 10 or more times in the processing of food crops. That, as well as energy savings, offer huge abilities. Savings and logistics and food handling that actually will help the quality of the food too. A lot of partners, very exciting. This one's been going on a couple years. This is another example of how we're working with things like our national laboratories, rural development, and other partners to facilitate better mapping.

I, just as one of my statewide programs on informatics and geographic information systems [00:08:30] where we offer that support to different efforts like this really crucial for good policymaking as well as management decisions. Another one is our working landscapes action team at the state economic summit. We had to work really, really hard to get this action team because when the very first state economic summit happened in California in 2012, I was there, and at the end of the day, you would have sworn the California economy was thriving on a barren asteroid in outer space.

There was [00:09:00] zero discussion of agriculture, natural resources, soil, water anything around that. We actually went out and commissioned this report. This is 2012 data. We're updating that now. Looking at what is actually

the real impact of working landscapes in California. Frankly, the numbers are going to go up considerably when we get the new report in.

Similar to that, right now, we've just kicked off our effort to catalyze a statewide support system for innovation and entrepreneurship. We're playing [00:09:30] the role of convener as well as putting some resources on the table, but going out into region by region and pulling together the existing players to say, "Okay. What's here and what's not here and how do we get it here and how do we leverage each other's resources and really make sure this happens?"

Because the reality is if you're not in an urban area or near a campus, you don't have access to that resources. You just really don't. Our focus here obviously is agriculture, natural resources, and our rural communities. We're doing things like hosting apps for Ag [00:10:00] and a lot of other very exciting things.

Actually, we've had four or five of our apps from our AG hackathons go into commercialization. Some of them have won some international awards. It's pretty exciting. We're teaming up young people. We're trying to take this the next step and get our 4-H clubs much more active in this thing. Similarly, as part of the vine, we're actually moving into as part of that statewide system bringing together a lot of very diverse partners. Working on things like making sure we've got [00:10:30] incubators and maker spaces that we're working with things like our US Patent and Trade Office, which if you folks haven't actually checked off their website, you ought to.

They have curriculum available targeting grade school to get our kids thinking about being innovators and inventors. We're now partnering that up with 4-H and are extremely excited about moving forward that way. Getting people to think about farm to floor. One of our county fairgrounds, the CEO there has now and it's a long story but long story short has [00:11:00] now incubated over 15 small companies in the last few years. We're trying to figure out how she did it so successfully so that our other County Fairgrounds can do a similar type of activity. Part of that replication effort.

As we do this, we've got a really keep in mind that data is important. One of the things we're also doing, UC just announced a big program lately with our five medical centers where we're going to be taking all the data from those to be able to do very big data [00:11:30] mining and analysis to improve health outcomes. We're using that as a template to start figuring out how we take all of our data from UC as well as USDA and others to start doing similar data mining and analysis to help us with Ag and food and natural resource issues. This is that data hub that we'll be working on

Then, similarly a last, but not least very, very exciting project is really moving to things like citizen science and facilitating that. One of the greatest fears I have [00:12:00] is this very scientifically illiterate population we have out there and how on earth are we going to turn that around. If we don't turn that around, how are we ever going to start getting better policy and better decision making

from our leaders? We're trying to find ways to engage certainly our 4-H kids in a variety of ways, but adults too.

We just tapped into our master gardeners to actually help us with that interactive detection map and even doing door-knocking concerning Asian citrus [00:12:30] psyllid when we found hot spots and get them to try to teach and educate backyard folks with citrus trees on the importance of perhaps losing that beloved citrus tree. That their neighbors, people listen to them more so than they do to an average scientist.

There's a great role and a great synergy here and I guess that would be like my last comments. We need solutions that look at this interoperability of devices, integrating our data, making ease and use of that effectiveness of Ag tech available. [00:13:00] We've got to just really start looking at new ways to do business much like the biomedical revolution of the last couple decades. The integration of multiple disciplines, in fact, that's my last slide. The integration of multiple disciplines in single projects, as well as long-term projects, can lead to transformative innovation that promises productivity of Ag production, food safety, ecosystem services, while also giving rise to new opportunities for businesses and economic [00:13:30] development.

I end with just a final comment that as we move forward, NIFA and all of its partners finding new ways to facilitate this type of multidisciplinary research I think is really of the utmost vital need. Thank you. I'm glad to be here today. Is there a question? It's [00:14:00] after lunch. They're still digesting.

Megan Haidet: All right. Thank you. Next up, we have Stephanie Lansing from the University of Maryland.

Stephanie L.: Okay. He's down here all right. [00:14:30] I do actually like talking after lunch because I get to make really bad jokes about digesting your food, why I talk about digestion. What I'm going to talk about is just talk about one technology, but I'm not really going to talk about what digestion is because that's not really what's important here. What's important is the fact that this is an example of a technology that has so many different hats and so many different facets that it often has trouble finding a place in [00:15:00] NIFA.

I've gotten grants on AMR, from [inaudible 00:15:04] from other things, but it's always a little bit here and there. Just as an example I'm right now the chair of the Northeast Extension Farm Energy Group so spoke at a farm energy group. Last year I was speaking at the Northeast Greenhouse Gas Summit so that's another category. Last month it was the Environmental Law Conference, a couple weeks before that it was the Nutrient [00:15:30] Management Group. All of these have to do with this one technology, but yet it's in all different facets.

What I'm going to talk about is actually food digestion because that adds even another complexity to it. That's where it really [inaudible 00:15:48] right now

the, you say we want interdisciplinary teams, but yet there is no place for technologies like this often that need interdisciplinary teams because there's not a silo for it to go [00:16:00] in.

All right. Let's see if I can figure this out. Next. All right. Just for those of you that don't know the two second version, digesters, food waste, crop waste, anything, sewage sludge goes into the digester, breaks down with microorganisms you get biogas out just like methane, you can, natural gas that methane can then be used any way we need as natural gas for vehicle, fuel, but it's mainly used for electricity production, but all the nutrients that go in basically come out.

You have organics [00:16:30] coming in, methane being produced, and nutrients coming out. If we look at where we are in terms of anaerobic digestion, we have 265 on-farm digesters. Germany has almost 10,000 on-farm digesters. China, that's not a typo that is 40 million. This is a place where someone like Germany is with less than 30% of our agricultural output has so many mores of these systems. They have so many [00:17:00] digesters that one of the things that they're doing is actually holding the biogas in some of their systems and using it at like 4:00 or 5:00 to round out when the solar energy goes down and using actually biogas as a battery system.

But again with 265 digesters, we're nowhere near where we could be in terms of just this one technology. If we look at where we are the operational digester so this is a map from so AG star is [00:17:30] basically between EPA, USDA, and DOE, but basically they just provide a clearinghouse of information. They don't provide research funding or farmer or any money directly to farmers. They just provide information.

This is some of the things that they produce showing where we have our digesters and, again, some of them are co-digesting with food waste, but most of them are just on very large dairy farm. We're talking a thousand cows or more. But if we look at where we are so, again, we're looking at 10,000 digesters in [00:18:00] Germany versus a couple hundred here and we're only getting 30 or 40 new digesters a year. The penetration isn't coming. They're in these very large farms.

If we look at our average dairy farm whether it's Maryland or anywhere else, our average cow is on a small farm. There's where we're talking about economic development and rural development and our average cow is small farmers. We employ lots of small farmers. Sorry. Our average farm is very small, our average cow is on a large farm because our large farms are very [00:18:30] large. Most of these farms that have digesters we're talking about 1 in 2000 cow operations, which really when we're talking about sustainability, one things we want to do is help the small farmer and help with the rural development.

Unfortunately, where we are within the US, we aren't able to do that. Well, in other countries they've been able to build digesters on these very small scales. If we look at why we have digesters and why we care. Again, they're in one spot,

[00:19:00] it's easy to do. The manure is there. All we have to do is put in digester, we get a renewable energy, and then, we still have the nutrients on the back end to use for fertilizer.

If you have a lagoon, just put a cover over it, and then, we have renewable energy. Without digestion without putting a cover over that lagoon 10% of all greenhouse gas emissions associated with agriculture from methane coming home from those lagoons. By just putting the cover over it, we've solved the problem. By then putting a generator on the end, we're now creating renewable energy.

[00:19:30] It's something that can solve multiple problems. Again, then you have the food waste coming in. This is where you have states like Massachusetts that says, okay, no food going to landfills by 2025. Where are they going to go? Right now we have some composting operations. We also have, they could go in digesters. Almost all the 10,000 digesters in Germany co-digest why? Because the food that we have, if I put the food waste directly in the digester, I have so much more energy production than [00:20:00] if I put it my stomach first or the cow's stomach first, and then, I take that manure in and put it into the digester.

We could greatly increase the energy production from these systems by adding this food waste, but we don't really have that mechanism in place right now. Again, what Germany has done to, they actually have a policy where if you're a smaller farm you get a higher electricity price. That helps because, again, the costs are not linear with these systems. It's not if you have 500 [00:20:30] cows it's half the cost of a thousand cows. It doesn't go that way because the pipes and the generators and some of these things don't have a linear scale. They give higher prices to smaller farms.

We look at what the EPA has said. The EPA has said, "You know what? We have 11,000 digesters we can have right now with the existing technology with existing based on large farms that we have in the US, which would power 3 million homes and reduce greenhouse gases by 35 million [00:21:00] metric tons of CO2." It's supposed to be 265. I gave an extra 100. We have 265.

The thing is is we've identified this so why aren't we doing that leap? What is the problem here? This is something that NIFA can try to address is looking at if we have this technology, why are we so far behind? Again, part of it being the food waste digestion when we get into food waste. How is the food waste going to get to the digesters? How are we collecting the [00:21:30] food waste? If we're having these initiatives where we want to increase sustainability and increase food waste going from less of it going to the landfill, we need studies to really study the infrastructure of food sustainability.

How can the waste get to these farms, and then, how can we digest them? If we have food waste, again, it greatly increases the biogas yield. This is a farm in Maryland. Again, this is one of these farms where it's not a multi-million dollar farm. They just put a cover over their lagoon, but they're adding food wastes in

there and they're a very successful farm. What [00:22:00] you can see here is, again, the food waste, the chicken, and so, those red bar graphs are basically the chicken, the meatball waste. It's the manures the little orange one on the end.

Again, it's not even comparable in terms of the amount of biogas production we can get, but yet food waste policy it's really important about what are the policies in place, what's the infrastructure in place, what's the transportation, how do you get farmers to get with the food waste producers and have a synergy? For this farm, this is [Kilby 00:22:29] Farm. [00:22:30] What he did he has a middleman who actually brings food waste from New Jersey to Maryland.

Is that sustainable? The reason why they do it is because they get extra points on the Walmart sustainability index. These are the meatball factory that actually produces meatballs that goes into Walmart and if they dispose their waste into a digester they're a preferred buyer in terms of Walmart's sustainability index. There's ways to get it done, but it is really that sustainable bringing it from [00:23:00] New Jersey down to Maryland?

But economically it works for this farm, and so, they get a lot more biogas production from it, they get paid for it so the tipping fee that they get pays the loan that they took out to build their digester, and then, the electricity is just free. Then, they get money from selling it back to the grid. There's ways to do this and there's, the infrastructures in place, but it's just all over the place. There is no integrated policy.

Then, we look at the nutrient management side. Again, [00:23:30] the over-cited digesters it's just part of their nutrient management plan. Whether I have a lagoon or a digester it's part of getting it from the cow to the field. The digester, again, the effluent most, the solids go down, the methane goes, the carbon goes down, the odors go down, but I still have a lot of nutrients. What I can do with that though, I can do manure injection really easily because I've lost a lot of my solids.

When I do apply, I can apply throughout the summer because it's not going to smell. [00:24:00] I can apply in other times. I can also do advanced nutrient treatment after that application. I can actually do, we've done struvite extractions in our lab and in the field. We've done other things, wetlands. We've done aeration ponds. We can actually extract some of those nutrients that we couldn't do if we hadn't digested it at first because it's in the matrix, the poultry litter matrix, the cow manure matrix.

There's things we can do but now we're going to add food waste so that's going to make us economically favorable like it did for Kilby [00:24:30] Farm, but now that food waste has to go into my farm nutrient management plan, but yet none of these things are really studied from a large global scale on how all of this is going to come together. Again, but then we have to understand the dairy industry.

Right now farm prices are really low. You're saying farmers go build digesters. I don't have money to pay my employees so how am I going to do that? Co-digestion works, but again we don't have the infrastructure. We need to understand, the other thing is, again, poultry litter digestion. We've done that a little bit the [00:25:00] problem is in Germany they co-digest, the poultry, the swine, the dairy. We've got poultry in in Maryland, we have swine somewhere else, we have dairy somewhere else so we don't really have that infrastructure so how are we going to make it work for us with co-digestion?

Again, there's no monetary benefits of digestion. I talked about doing work with antibiotic resistance. Again, I do work with digestion and composting on antibiotic resistance, but there is no money for the farmer for actually putting in these systems for some [00:25:30] of these ancillary benefits that we're really important. Again, if I'm a dairy cow my, and I'm sick, my milk doesn't go into the food system, but my manure it still does.

If you have some sort of advanced manure technology, you should be able to get some sort of a benefit from that and we haven't done the policy or financial analysis for that. Again, the difficulty paying financing. I'm a small farmer. I want to build a digester. I have to go a power purchase agreement. I have to get the food waste and have them pay me for taking the food waste in. I have to, [00:26:00] if I want greenhouse gas credits or reqs, I have to know how to manage all of this. It's difficult and we need that education to farmers to do that.

The conclusions are there are no silver bullets, we know the benefits, we've quantified them. There's an industry ready to build you a system, but yet it's not necessarily economical and the pieces are all over the place and not only money, but policy efforts are needed to drive adoption rates. We really need to look at the policy at funding. [00:26:30] We need to look at it from this larger scale because it's not one place.

Again, I'm someone who wears many hats. Again, wastewater sludge, after a digester the sludge goes on to the farm fields. There's so many ways that these interact, but yet there isn't really a mechanism within NIFA to fund this type of large-scale integrated research that has a lot of benefits. I'll take any questions. All right. [00:27:00] Thank you.

Megan Haidet: Thank you. All right. Next up, we have Rama Radhakrishna from Penn State University.

Rama R.: [00:27:30] Good afternoon. Thank you for the opportunity to give us some our feedback to the priorities that NIFS is talking about or garnering from all of us gathered here and elsewhere in Sacramento, Atlanta, and other places. First, I bring greetings from the American Association for Agriculture Education, which I represent and also the [00:28:00] NCAC-24 Agricultural Education Research Committee that is a component of all social scientists educational scientists and

extension educators across the land-grant university, and some of you this morning talked about your connection to NIFA.

I have a little connection too. NIFA Director Dr. Sonny Ramaswamy, I and my newly [00:28:30] minted colleague, [Anil 00:28:32], all came from the same institution, but years apart. It is just a pleasure to have that kind of a proud moment to share with you. Two … Is the … Okay. As I said I represent NCAC-24. It is an advisory committee [00:29:00] mostly made up of department head, chairs, program leaders, and others particularly in the social science of Agricultural Sciences and also particular administrative advisors specifically associate dean for graduate education and research.

Our goal is to expand membership across our member institution, support multi-state projects as some of you mentioned earlier, integrated projects, and [00:29:30] interdisciplinary and so on and so forth, and also keep a communication going on with agriculture research priorities, capabilities to policymakers, of course, NIFA, USDA and other federal and local entities. What I'm going to share with you about who we are and what we do and as you can see from this slide, agriculture education broadly defined includes teacher education, extension education, leadership, and community [00:30:00] development, communications, and in the last couple of years, we have also engaged in international agriculture development.

Because of this expertise we have, we are well positioned to address the 21st Century challenges both in agriculture and allied sectors. NIFA educational institutions and research enterprises, we can all collectively work to find solution to world's biggest problems … [00:30:30] the challenges, again, I want to emphasize that we are present in every land-grant university, every state, every county perhaps every school district. This is a valuable thing to say about our grassroots involvement.

Now, here is our approach and strategy to the priority listening session is that I will summarize in the last slide [00:31:00] what we are and this is 21st Century challenges to agriculture and environment require approaches that consider the wide spectrum of stakeholder's perspectives and expertise that you have already undertaken and that is more valuable, a value to it because hearing from different perspectives will understand the problems in a better way and provide some solutions that are feasible and also provides you some impact data.

Skillful [00:31:30] interventions must take place through educational institutions, businesses, governments, and other social systems to discover and adopt solution to these challenges. Again, some of you have mentioned collaborative efforts, integrated efforts, multidisciplinary efforts, all these fit into our strategy of addressing the priorities. Equally important is the engagement of multidisciplinary scholarship that integrates faculty roles of teaching, [00:32:00] research, and extension, combining bench and social sciences are needed.

That's where the investment can be made. One thing is today challenge we face is a single discipline cannot solve any problems that confront us. We need a multidisciplinary approach, integrated approach to solve the problems that we face and just engagement is not enough. We must develop [00:32:30] human capacity that is planned, integrated, and embedded to address these complex issues.

Particularly, as social scientist, extension folks who are themselves call as in the business of people. We need to have that kind of an engagement. I have specific requests to, again, as we said knowledge plus application plus value equals transforming [00:33:00] lives. That is the outcome or the goal of these listening sessions. We need to look into that how providing knowledge has application, and then, use and ultimately meets the needs of the, you find other funding agencies.

I want to emphasize here that need for social science presence is very, very important. It is stronger than ever before. Presence of engagement of social sciences is imperative [00:33:30] for creating and delivering programs that increase science-based knowledge and about modern food production and its health, relationship with human health, economic well-being, social stability, energy production, and environmental sustainability.

Some of you mentioned earlier this about plant health, animal health, and one health. We have at Penn State all the three things combined; plant health, animal health, [00:34:00] and human health. We have a huge project that is going on combining the animal science groups, the plant science group, and the social science, nutrition and so on and so forth.

Again, I encourage NIFA to provide substantial involvement in social science research, social science faculty are experts in RFPs and RFAs is paramount if we are to showcase the value of our programs, efforts, [00:34:30] and approaches to public good. It is very important involving, again, all of the presentations this morning had a specific interest in their own disciplinary areas whether it is consumer horticulture or is it community development or is it animal science or whatever it is, but there is a need for an integrated effort.

Looking at the two questions you asked us about the priority, I did not go through the specific part [00:35:00] of it, but I created a little framework for us or I think I'm missing a little slide here in my notes. One thing is technical content is emphasized, but it doesn't alone can help us solve the issues taking about 5 or 10% for evaluation or education in an RFP is not going to cut it. We need to have more effort to human capacity building development that is planned, integrated, and embedded [00:35:30] in the proposal is essential to address complex issues.

Here is the one that I created this framework for us to … Here is, you are asking for us to, listening from us about all the things that we do in that extreme and NIFA listens in science and in to do some [00:36:00] regional multi-state national

projects, very much, there are some regional things, some national things, and some specific things at the state level could be done. We must integrate through teaching, research, and extension.

Again, as my discipline is business is education, education, creating courses, developing online programs, extension programs, and evaluation, and assessment. We have the resources. [00:36:30] We have the things to address wicked problems, complex problems that is confronting us whether it is youth development, whether it is nutrition or obesity or bullying, opioid crisis, what-have-you. All those we could do with our efforts.

Finally, whenever I go and do programs in extension people ask the question, what happened as a result of your program? [00:37:00] Assessment and evaluation are key to success for whatever efforts that NIFA are, we as coming from educational institutions. We need to assess overall impact. I think Dr. O'Neill mentioned about outcome measures, individual outcome measures, specific measures.

Dr. Jones mentioned about impact on positive youth development, long-term impact, changing in behaviors. [00:37:30] It is not a two-year project, it is a five-year, six-year projects. We need to build mechanisms to assess those to see where we are heading. Cost-effectiveness, rate of return on investment are critical things that NIFA must to consider in, are to make a difference. If you want to transform lives that's what we have to do.

Again, as you can see we are a community of educators, programmers, scientists, [00:38:00] teachers impacting many. Again, thank you for the opportunity to listen to us in order for you to help craft the future agricultural and environmental agenda. Thank you.

Megan Haidet: Any questions? [00:38:30] Okay. Next up is Matt Carr from the Algae Biomass Organization, and if you are interested in speaking after Matt, can you just raise your hand? Okay. Maybe you'll be inspired in the next 10 minutes, but if not we'll have some closing comments before the end of the [00:39:00] day.

Matt Carr: Hello. I'm Matt Carr, Executive Director of the Algae Biomass Organization. Very much appreciate the opportunity to provide our input and also want to recognize Mark Allen from Xcel Energy Corporation is here. He's my board vice chair and policy committee chair and would be glad to follow up with you as would I.

I want to take you through a whirlwind tour of the world of algae [00:39:30] and how it fits into the US agricultural scene. Then, take you to research priorities that we'd like to recommend to NIFA. Just a little bit about ABO by way of background, trade association for the algae technology sector. We have over 200 members. They include corporate and institutional members, businesses, and universities as well as individual [00:40:00] scientists and also we are hosts

to the world's largest algae conference, which just wrapped up last week in Salt Lake City.

Just a snapshot of our corporate and institutional members there. You'll see some large big names, but mostly early-stage technology developers out of universities and national labs and garages doing some really amazing things. I wanted to walk through four [00:40:30] key areas of the role of algae in agriculture, nutrient management, and soil health. We've already heard a little bit about today. We agree this is a key area in need of investment, expanding agricultural production and the role of algae and bringing new land into production as well as increasing productivity of existing land.

Algae is a sustainable new crop for a variety of end uses. [00:41:00] Then, the role of algae in job creation in the rural economy. Just quickly by way of background, what do we mean when we talk about algae? Of course, there's some of the earliest life forms, extremely diverse. We only have I think a narrow slice of knowledge about what's out there and the algae and microbial world. We consider algae to be at everything from microscopic to the giant kelp seaweeds. [00:41:30] We also are very inclusive so we include cyanobacteria and some other sort of marginally algae-like organisms.

We're very welcoming as an association. Mostly photosynthetic organisms we're talking about, some feed on sugars or do both. All right. When we talk about the role of algae in nutrient management, we're already beginning to see some interesting work [00:42:00] on the deployment of algae-based systems for tertiary wastewater treatment now in municipalities. Algae love to gobble up nitrogen as well as phosphorus depending on the conditions.

Nitrogen is a big problem from cities, but of also, of course, from farms as well as rural manufacturing. The first large-scale commercial tertiary algae-based water treatment system is now under construction [00:42:30] in Salt Lake City. We visited that last week, but we also, some really interesting on-farm work that's happening at a number of institutions including Utah State on managing nutrients from farms, integrating with digesters and otherwise trying to keep the nutrients on-farm and keeping the value there with the farmer.

At the other end of the nutrient chain, once the algae have gobbled up the nitrogen and phosphorus as [00:43:00] well as carbon they conserve a really valuable role in returning those nutrients to the soil. We have other folks that are working on developing algae-based soil amendments and biofertilizers that I think have the potential for profound impact on the sustainability of agriculture, precision agriculture, reducing the need for nitrogen-based fertilizers and subsequent runoff and emissions there from [00:43:30] some really exciting work that's happening in that space and already some really exciting work that's happening in the fields and piloting some of these products.

Just one example here of the algae fed melon on the left and traditional melon on the right and all that the really appealing characteristics that you get with

that switch. Not just nitrogen and phosphorus but algae are highly efficient photosynthetic organisms so they also take [00:44:00] in carbon, some really interesting work that's happening on the use of algae for carbon capture and reuse including at ethanol facilities of a very appealing place to do this work. We have carbon dioxide from the fermentation process as well as wastewater that's rich in nutrients.

All food for algae and the algae can then become food for either the corn or other crop or for neighboring dairy cattle [00:44:30] operations so very interesting work there. Some work by the Department of Energy to analyze the opportunity for the collocation of algae-based carbon capture systems with point sources. Looked at coal with lots of opportunities in the Gulf region as well as ethanol in the upper Midwest. I think a lot of promise there.

At its heart though algae, I think, represent an [00:45:00] opportunity for a promising, highly promising, highly productive, and highly sustainable new crop because of its exceptionally fast growth rate and when you look at the opportunity for biomass yield microalgae really blows away anything that we are doing today [inaudible 00:45:24] agriculture here in the US, sugar cane comes close to current microalgae productivity, [00:45:30] but we're really at best at year 10 probably of development of this and domestication of this crop compared to hundreds plus years of domestication of some of the other crops.

I think that there's only upside to come on this, and so, when you get that intensification combine it with the fact that really when you're growing algae you don't need fresh water. In fact, fresh water is the last thing you'd probably use. Wastewater, [00:46:00] saline, aquifers water that's really of little or no use to us in agriculture or domestic use. The carbon sequestration potential and the intensity of land used make for a really, really appealing sustainability profile.

In terms of end uses, I'll just fly through some of the most interesting work that's happening here. A whole range of [00:46:30] interesting new food products are emerging, mayonnaise, beverages, plant-based protein substitutes for meat and shrimp, baking, energy bars so really interesting niche or nutrition applications for human and animal health including powerful antioxidants, natural food colors, but really I think the big growth area is likely to be in feed and the very appealing attributes of some strains of algae and [00:47:00] their ability to produce marine omega-3 oils, which otherwise can only be obtained from fish, shrimp, and other marine organisms.

This has already resulted in construction of probably a half dozen industrial production facilities for algal-omega-3 oils just here in the US alone over the last three years with more to come. That becomes I think the tip of the spear for moving into broader adoption of algae as [00:47:30] a supplement to sort of whole feed supplement and when you look at some analysis of bringing algae in as a feed substitute, when you factor in the land use intensification, you have some very appealing potential scenarios in the future of returning other

marginal lands back to their native state, afforestation, and some great outcomes for the climate.

Other really interesting applications [00:48:00] in animal health. Companies that are developed the beta glucan and other immune stimulants from algae platforms. Some limited good work that's already been done in parts were supported by NIFA on feed trials, but I think a lot more needs to be done. We're on the verge of seeing broader acceptance of algal ingredients in the feed world, but there's still work to be done there.

Then, finally, some really interesting [00:48:30] applications in bio-based products, advanced biofuels, aviation biofuels, just some examples from the past year or so. I also want to mention really sort of interesting trends in macroalgae seaweed farming in coastal waters. Really this has been done for centuries overseas but to a very limited extent here. I know NIFA has funded some work recently in this area. I think this is another area of potential growth and opportunity. [00:49:00] It brings us to jobs in rural economy.

We're talking about bringing in a whole new generation of farmers. These are young folks coming into agriculture often from urban settings and bringing jobs to some of the hardest hit regions of the country and those are jobs farming, but also in value-added manufacturing. R&D priorities in these areas for nutrients recycling and soil health more research and pilot work needs to be done on [00:49:30] farm algae-based nutrient recovery systems alone and in conjunction with digesters for example.

Field trials of algal soil, amendments, and biofertilizers are going to be essential to adoption of those products and food feed nutrition, more field trials and ongoing research on development of the feed ingredients. I think this is one particular area where along with some other emerging new protein sources it would be really interesting to look at potentially center [00:50:00] of excellence for development and overcoming barriers to entry of some of these new protein sources that we're going to desperately need with the growing populations.

Support for new product development, in both of food and feed, but also byproducts. Then, work on farming, workforce training education, crop production, and pest management. We've had a lot of good support already from the Department of Energy in their early investment in algae for biofuels. That work continues but really it's focused [00:50:30] on the algae production systems themselves, the biology, the systems engineering, but when it comes to a downstream and upstream applications and integrations with agriculture that's where the real gap is in research and development and we think it's a very much and appropriate rule for NIFA to grow its participation. This is us, my contact information and that's my time. Thanks.

Megan Haidet: [00:51:00] Any questions?

Matt Carr: Any questions?

Megan Haidet: Can you please, if you have a question come up to the mic and introduce yourself? Thank you.

Mark: Matt, I was going to have you comment on the algae foundation and the work they've done under educational work they've done and the grants received and the opportunity for additional grant for that education program.

Matt Carr: Great. Thank you. Perfect. This is how you buy yourself at election, you plant [00:51:30] a little [crosstalk 00:51:30] … ABO also has a foundation arm whose mission is to support the development of K through gray education in algae. We have a program in K through 12 and developing a kit for teachers. Also, we've developed a community college certification program for a number of different tracks in algae. Some great work that's been done on a shoestring, a small [00:52:00] grant from the Department of Energy, but we think this could fit very neatly into some of the education work that USDA is supporting. I think there's a lot more that we can and should be doing in that space as well. Thanks for raising that, Mark.

Megan Haidet: All right. Thank you. Well, we have at least one interested unscheduled speaker. I would like to invite Professor Todd [00:52:30] Brashears up from Texas Tech University the Department of Agricultural Education and Communications. Thank you.

Todd Brashears: I can honestly say I don't think I've ever gone to speak in an event where I knew that everyone in the room was disappointed to see me. I'll be brief in my comments. I did not plan to speak today, but I, through some urging I felt like there's some areas that we need [00:53:00] to address before we get away today. Let me introduce myself. I'm Todd Brashears. I'm a professor of AG leadership at Texas Tech and I'm in the Department of Ag Education and Communications, and so, like Rama and others in the room, I'm a social scientist.

I deal with the people who deal with agriculture. That's the approach we take. In 1960, one American farmer fed 25 people. We now claim that number is 155 and we do so with pride. We say that [00:53:30] we are more efficient, we owe gains to our basic colleagues who have developed new breeds of plants and animals, new technologies that have allowed us to increase that number. There's a billboard in Kansas that I've passed for years where they have that statement it says, "One American farmer …" Maybe it says, "One Kansas farmer feeds …" It has been painted over so many times and the number changed.

You can tell that the farmer that [00:54:00] does that is proud about that fact, but what we don't consider are the 154 that are now 1, 2 or 3 or more generations removed from production agriculture. We get further and further away from understanding where our food is produced from and by ignoring

those 154 and only focusing on the 1, I think we're doing ourselves and our industry a great disservice.

We tell the story about the young man who, when [00:54:30] asked where chocolate milk comes from response with, of course, that comes from brown cows. I've told that story and I've laughed about it myself, but as I think about that I realized that young man is going to grow up to be a parent, to be a food purchaser, to be a voter, and quite possibly to be a legislator who is making decisions, budget decisions, and needs to be informed on policy.

Like many of our students, I'm a product of West Texas. I grew up on a cattle [00:55:00] ranch, my family still farms in West Texas. They're harvesting cotton today about 3000 acres. They also raise cattle. That's a pretty good snapshot of what our students look like. Our motto if you're familiar with where Lubbock Texas is, it's not close to anything. We say from here it's possible.

Our students laugh about that because they know that it's 350 miles to the nearest city from Lubbock. It has to be possible at Texas Tech because it's [00:55:30] too far to go anywhere else. Many of our 2300 students in our college are from those farms that you drive through and those ranches. These kids commonly count land mass not in acres, but in sections and as they come into our department I'm constantly amazed at how their knowledge about agriculture is really limited to their own personal experiences and their boundaries.

Part [00:56:00] of what we have to do is to expand that for not just for our students, but for all students. One of the most popular courses in our department is an agricultural advocacy course, which really just teaches the basics of what agriculture is both domestically and internationally. What amazes me is that we have to do that within a College of Agriculture, but we look at our students and even if they are coming from an Ag background they still have to have an expanded in a global view.

[00:56:30] We've been fortunate at Texas Tech to receive some non-land grant capacity-building funds over the years. We created, beginning in 2012, we created a program we called the SOWER Scholars. SOWER is an act that stands for Sustaining Our World through Education and Research, but it's also our logo. We use Van Gogh's image of the sower casting out seeds for our students to identify with.

Our goal was to bring in these interns, [00:57:00] to be with them for a semester, and then, cast them back out into the AG industry to make significant changes. These students come to us, we've matched them with mentors within the College of Agriculture. They spend a semester conducting research, going to different field trips, and understanding the AG process. Then, we recruit them back into graduate school. That NIFA-funded program has resulted in dozens of underrepresented minority students who have come into graduate school.

[00:57:30] Texas Tech announced last week that we have reached the threshold to become a Hispanic-serving institution, something that we're very proud about, something we've worked pretty hard for. We like to think, at least, in my building that this NIFA program which has specifically targeted Hispanic populations for graduate school had some small part in getting us to that level.

I would urge NIFA to really focus on their ability to expand [00:58:00] these non-land grant capacity-building programs. Programs like ours, one of the 70 non-land-grant universities that has a College of Agriculture really struggle for the ability to get resources and build that capacity. Most universities, while Texas Tech is rather large for a non-land-grant, I think, maybe second right now to one of the California schools, but we're rather an anomaly in that group. Most of the universities have fledgling research [00:58:30] programs, they struggle for resources. It's incredibly important for them to have the ability to develop that, to produce the students who are going to change the industry.

As we look at capacity building for non-land-grants, I would also urge to focus on AG literacy. It's going to be incredibly important as we move forward to make sure that those 154 that we're looking at are making educated decisions, [00:59:00] they're voting for people who are making educated decisions, and they're supporting the agricultural industry. Thank you.

Megan Haidet: Are there any questions for Todd? All right. Anyone else interested in providing comment today? [00:59:30] All right. Come on up. At this point, I don't have everyone's name and affiliation, but you're welcome to come up.

Mark Allen: Mark Allen. I'm with Xcel Energy Corporation and also the Vice Chair for the Algae Biomass Organization. I didn't plan to speak, but I did want to take the opportunity to mention [01:00:00] some things that occurred last week in our annual conference. I chaired a session, a plenary session with probably 400 people in the room on nutrient recycling.

I want to make the point here that we get more focused going forward in agriculture on sustainability and that we don't, I love the example earlier on the digesters [01:00:30] and taking food waste and animal waste, but I think you have to, we have to think about this as more completely through even the human manure. The stuff we send in municipal treatment plants and all the nutrients the concentrates there, and some of the things we're doing in the algae field is with the digesters is taking [01:01:00] the liquid that comes off that has the concentrated nitrogen, phosphorous, and some other goodies, and processing that through something like algae, which will use up that nutrient.

Also, if you separate CO2 off your digester gas, we'll take that, we'll close the loop completely on that and produce for instance animal feed protein [01:01:30] or biofertilizer and really start to close the loop on the nutrient cycle, which is agriculture, but understand at a bigger context extend it out into some other areas. I also wanted to mention climate change. Invariably agriculture is caught up in this. It is at the moment, we don't say enough about it.

[01:02:00] It's going to bear the brunt of a lot of what we see coming in climate change from rainfall distribution, temperatures in the air, temperatures in the soil and so forth. It's also a tremendous opportunity to do something about climate change in how agriculture is practiced and how we closed the loop on nutrients. I think any organization that is looking [01:02:30] in fashioning research and practical initiative in agriculture going forward really needs to be looking every day at addressing, closing the nutrient cycle, and the opportunities and the mitigation we're going to have to do in agriculture as well. Thank you.

Megan Haidet: [01:03:00] All right. Anyone else? Okay. Well, I'd like to thank everyone for coming out and contributing to NIFA Listens. If you would like to spread this opportunity to your colleagues and other stakeholders, we are still accepting comment through December 1st via the stakeholder input form on our website. That website [01:03:30] is www.nifa.usda.gov/nifalistens. I'd like to invite Dr. [Karashi 01:03:40] back up for a few closing comments.

Karashi: Thank you, Megan, and good afternoon everyone. Well, we had a great [01:04:00] day today. I want to conclude by saying when our new secretary of agriculture, Dr. Sonny Perdue was going through the hearing process and came and addressed us, he used a phrase called, and I quote, "Do good and feed everyone." Wow, what a powerful and overarching [01:04:30] statement and concept and message that is.

That's what we do in NIFA. We do good but to show that we truly do good is that if what we are doing aligns with what you think is good. Is that confusing? No. Very simple too many words. What I'm truly saying is that myself and my colleagues [01:05:00] who have this responsibility of ensuring that the programs, which we offer through NIFA are not only aligned with the priorities, which are given to us through the legislation, through the Secretary, through the Office of the Science and Technology, Policy, Farm Bill, and what-have-you, but also the priorities which you, the stakeholders, the partners think are important, in food, agriculture, natural [01:05:30] resources, and human sciences.

That's the breadth of the context of when our secretary say, "Feed everyone." Because that context includes all of these entities, which I just listed or stated. I know it takes a lot of time and effort and energy to do this exercise. We heard today that some of you before coming here [01:06:00] to provide your input really huddled amongst your own constituencies. You had sessions, you had conference calls, you had meetings to really think through what is it that you're going to share with us today.

We have representative from Northeast. We heard from Mike O'Neill. We had Ed Jones from ECAP. They are not individuals. They huddled together and talk through [01:06:30] in a very purposeful way what should be the next priorities for NIFA and what are the next opportunities for us in this arena of production

agriculture or food agriculture, natural resource, and human sciences. I truly, truly thank you for all the time you have taken to provide in-person comments.

I think between all the four sessions we had so far about 80 to [01:07:00] 100 people actually spoke on the podium like this all together. Probably have 400 or 500 comments which we have received through portal so far, in a portal, as Megan said is still open until December 1st. We really hope that more input would continue to come and that would then make, that would then start our job, which is how do we take all this input and synthesize it in a meaningful way [01:07:30] that we can essentially do two things.

One, this feedback would absolutely inform our budget process as I said earlier this morning, and second, this input hopefully would be prioritized in a shape or form that we can actually insert it and reflect it in our request for applications for future program offerings. In addition to thanking [01:08:00] you and letting you know what is the next step these presentations from all four sessions, by the way, this was the last for external listening sessions we've had today.

All of these webcast presentations, as well as the transcripts, would be available on NIFA website. I think previous, two are already available, third one is probably in process and this would also be available in its entirety [01:08:30] on our website and, hopefully, when we will synthesize this information into certain priorities we'll also be able to absolutely share with you all.

Before I conclude, I also want to thank my NIFA colleagues. They have been truly engaged in this process for a while. This is really, this is our job, this is what we do, and as I said we will certainly report back. But I also want to take, again, [01:09:00] this opportunity to thank Dr. [Merrill Broussard 01:09:02], who really has been an inspiration for all of us. This was his vision that we not only listen to our own subject matter experts, but we do a really earnest effort to reach out to what secretary calls us that we are in the business of public service and our public service is really listening to you, and then, providing financial assistance, which the [01:09:30] legislation, legislators, and the lawmakers have entrusted upon us to do.

Thank you so much again and this concludes our fourth and the final NIFA external stakeholder listening session. We stand adjourned until we communicate further. Thank you so much, everybody.