

Jeanette T.:

Go ahead and get started. We have folks participating remotely all around the country this morning, so we want to get started with NIFA Listens: Investing in Science and Transforming Lives. What a wonderful morning in the Farm-to-Fork Capital as I understand it here in Sacramento. My name is Jeanette Thurston and I work for the National Institute of Food and Agriculture and we welcome you today. Before we get [00:00:30] started just a few items, we do have refreshments at the back of the room, there are restrooms outside to the right, and we also have agendas if you didn't pick one up.

So to get started, a little bit of background on myself. I work for the Office of the Director, but I have actually been with USDA for 17 years, it's gone by really fast. Right out of grad school, I went to the University of Arizona, I got my undergraduate and graduate degrees, go Wildcats. [00:01:00] Then I took a job with the intramural research branch of USDA, Agriculture Research Service, I was there for eight years. I then decided to join NIFA as a national program leader in food safety, and just a few years ago I decided to join the Office of the Director as a science program and analysis officer.

I'm joined here today by several of my NIFA colleagues and Dr. Muquarrab Qureshi will give a short presentation and introduce our colleagues here in just a few moments. To give a little background, so this is the third NIFA Listen session that we've had [00:01:30] this year, very excited about these sessions. The first one was held in Kansas City, the second one was last week in Atlanta, and here we are in Sacramento, California today, and next week we'll be in Greenbelt, Maryland. If you're able to participate in person, that's fantastic, it's also fantastic if you can participate with us remotely.

We're asking for input to two questions, these questions are what is your top priority in food and agriculture research, education and [00:02:00] extension that NIFA should be addressing? What are the most promising science opportunities for advancement of food and agricultural sciences? We're hoping to hear from our stakeholders all across the country on their input to these two questions. We're asking for input not only through these in-person sessions, but also online, and Dr. Qureshi will have a slide that will show the web address and how to apply and submit your comments online. We'll be collecting those comments until December 1st.

[00:02:30] Okay, so I have a little bit of logistics for our day today, I'll be your bus driver. I'm taking us on this tour today. We have quite a few speakers lined up, and we're going to try to stick to that agenda, have it really flexible too. So if somebody is late or is unable to participate, I'll just drop down to the next speaker on the agenda. Also, you might notice that our talks today end right around 1:40, that means we have a lot more slots for folks who would like to give their comments [00:03:00] but weren't able to register. We'll have that opportunity and if you could go outside and make sure you just give us your title

and your affiliation and your name, and I'll make sure I'll be able to introduce you today after lunch.

We have a break, we have a lunch and we have another break this afternoon. Our first break will occur right around 10:10 this morning. Before that, the folks that are in the room we'd really like to have a picture taken with all of us that are participating here today, so before you grab [00:03:30] your refreshments and if you don't mind, allow us to take a picture of all of us together, that would be great. We will have lunch, lunches on your own beginning at noon and then we'll reconvene in this room at one o'clock and we have several talks after lunch.

Each speaker will get up to 10 minutes to give their comments on those two questions or anything else they'd like to tell NIFA. I'll be the one giving you your warning, your five minute warning, your two minute warning, and then if I stand up that means [00:04:00] I'm reaching for the hook to pull you off the stage. Please make sure you speak up here at this podium. I know I'm one of those people who's really animated and can't stand being tied to this podium but we need you to do that because we are webcasting this live, and we are also recording this presentation as well.

Speaking of which, if you missed the first two sessions, those are recorded and you can watch those online on our website. So again, we were in Kansas and Atlanta prior to today and next week [00:04:30] we'll be in Greenbelt, Maryland. Today's presentation as well as next week's presentation will be available online on the NIFA website. Okay, I guess the other thing that I'd like to make sure everybody has their cellphones off. If you do get a phone call, please take a walk outside and carry on the conversation out there.

I think I'm going to start with Sonny's presentation, Sonny's message. Our director, Dr. Sonny Ramaswamy [00:05:00] provided a message for you all to hear today. Unfortunately, he couldn't be with us. If we can go ahead and put that up, that would be great.

Dr. Sonny R.:

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 to be personally involved in telling us [00:05:30] 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're 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, you could certainly go to our website nifa.usda.gov/nifalistsens, [00:06:00] again, nifa.usda.gov/nifalistsens.

You have the opportunity to provide additional input through the 1st of December of 2017. I can guarantee you that all this input that's going to be provided by you in person or through our website. I'd encourage you to also talk to your colleagues that have not participated here and tell them to also provide

input. We are going to take all this input and analyze [00:06:30] the information that's been provided to us and incorporate that into the priorities that we are 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.

Jeanette T.: Okay, sorry about not being able to see a Dr. Ramaswamy there at the beginning, but a great message. I'd like to now [00:07:00] bring Dr. Muquarrab Qureshi to the front. He is one of NIFA's deputy directors at the National Institute of Food and Agriculture, and he's going to give you a little bit of background on the agency as well as introducing my NIFA colleagues who joined us here today.

Dr. Muquarrab: Thank you Jeanette and good morning everybody. We are here in Sacramento doing our third NIFA Listens external stakeholder session. Before [00:07:30] I start giving some very brief opening comments, I would really like to introduce my NIFA colleagues here so that you get to know who they are, and what their administrative responsibilities are and also what their subject matter expertise are, so that during the break we can co-mingle and have some intellectual conversation. So first let me invite Dr. Luis Tupas.

Dr. Luis Tupas: [00:08:00] Good morning, I am Luis Tupas, I'm the deputy director for bioenergy, climate and environment at the National Institute of Food and Agriculture. I assumed this role in 2014, so I'm fairly new. I've been with NIFA and it's predecessor, CSREES, since 2004 so I moved up the ranks. I am [00:08:30] a microbial ecologist and a geochemist by academic training and I spent 12 years of my academic career at the University of Hawaii. I'm really glad to have this opportunity to speak with you especially because this is the western region and I am the NIFA liaison to the western region both for all for research education and extension, so this is my crowd.

We'd [00:09:00] really like to hear from you and to really engage in these kinds of events so that we can do better in the way we invest the funds that are provided to us and to receive your input for our strategic planning. Thank you very much.

Dr. Muquarrab: Thank you Louie, Jeff Steiner.

Dr Jeff Steiner: [00:09:30] Thank you Muquarrab, I'm Jeff Steiner. I'm division director for plant production in the Institute of Food Production and Sustainability. We cover the range of production and systems challenges that agriculture faces, animals, plant production, plant protection and various information and other technology solutions. I've been with NIFA for about two years, prior [00:10:00] to that I was with Colorado State University and before that 25 years with the Agricultural Research Service. I'm a Californian but I'm an OHSU alumni, so go Beavers. Glad to see Oregon State represented here, and welcome again. Thank you for participating in this very important event that we're doing.

Dr. Muquarrab: Thank you Dr. Steiner. Kelly.

Kelly Sprute: Good morning, my name is [00:10:30] Kelly Sprute, I've been with NIFA for one year and what my role is, is I'm in part of the communications staff. My job is to tell your story, and we do that in very unique and interesting ways. We have a few platforms that we do that on, you've probably seen two of our electronic newsletters fresh from the field or NIFA update. If you haven't, I will tell you how to subscribe to those and get your communications staff or department directors [00:11:00] to subscribe to those.

Because we use your successes, NIFA funded science successes, in our annual reports, in those fresh from the field newsletters as well as the NIFA update. My role at NIFA as the communications staff is both internal manager of communications as well as stakeholder communications manager. Those important information that you need to know especially if you want to subscribe to any [00:11:30] of those topics is to go to nifa.usda.gov. If you want to know about the fresh part, please go to our website again and put a hashtag on there and go to ... Make sure I get this right. I believe it's just a #fresh, and you can go directly to that website.

Also, the website for the impacts is again nifa.usda.gov [00:12:00] and that's a forward slash with impacts, and if you're not following us on social media, please follow NIFA@USDA_NIFA, and then use the #NIFAImpacts to tell your story. We collect all of those stories with those resources so that we can help share your science. Thank you very much.

Dr. Muquarrab: [00:12:30] Thank you Kelly, I appreciate it very much. As you see, we are here simply for the purpose of listening to you and we look forward to listening to all the presentations which are scheduled this morning. Just brief overview of who we are. NIFA, as you know, is US Department of Agricultural Extramural Science Funding Agency. We are part of a USDA mission called REE, Research [00:13:00] Education and Economics mission area. Other partners in REE Mission Area are Agricultural Research Service, National Agriculture Statistical Service as well as Economic Research Service and the National Ag Library.

NIFA funds activities in all three areas of research, education, and extension and outreach. As you know, our portfolio is almost \$1.5 billion, so [00:13:30] we are hoping today through these listening sessions that we will have your feedback and comments, not only research specific, but on our entire portfolio of research, education, and extension as well. We collaborate with leading scientists, organizations, institutions, entities such as you to get feedback so that we can align NIFA's programs and offerings with what is important to you [00:14:00] all. We believe that through these type of scientific discoveries we can certainly make a difference across the country and around the globe.

NIFA sets its budget or gets its marching orders from the Congress of the United States. I'm sure you all know what a Farm Bill is. A Farm Bill contains all the legislative authorities and the granularities which [00:14:30] tell us what the

priorities are important to the Congress for us to implement. We also look towards guidance from our Secretary of Agriculture, and by the way I bring greetings to you from our Secretary of Agriculture, Sonny Perdue as well as my own associate director of the program, Dr. Meryl Broussard, who could not be here with us today, but he oversees the full program institution in NIFA.

We get guidance from Secretary of Agriculture [00:15:00] as well as from Office of the Science and Technology Policy in the White House, what the senior administration thinks are important priorities in food, agriculture, natural resources, and human dimensions, which go along with production agriculture. We also solicit stakeholder input with NIFA as you well know that we have topnotch scientists who serve in the capacity of national program leaders [00:15:30] as well as program specialists. These are our program staff who are on daily basis tuned to what is important in their particular subject matter area. They do PT meetings, they attend professional society conferences, they do listening sessions and webinars of their own, so that they can keep abreast of what is important for the portfolio they're managing.

We listen to them as well as we listen to the external stakeholders as Jeanette was saying, [00:16:00] this is our third external stakeholder session. The idea really is that we can get a very broad overarching feedback from you all what you think is important for you for NIFA to consider. At the end of the day, we hope that all of these feedback and inputs would help us determine what type of budget priority requests we should make in the years to come.

Also, I think it's important [00:16:30] for us to know what programs are working good for us, what programs are really mission critical not only for us but for you as well. But at the same time what programs NIFA should not consider as priority anymore. In other words, should we move on? Have those programs done their job? Are they now being redundant or there are new priorities within that topic [00:17:00] area that they are far to consider. We look forward to hearing from you on those aspects as well.

As Jeanette said there are two very broad overarching questions we have floated, the first question is really what are your top priorities in food and agriculture research, extension, and education that NIFA should consider? The second really is what are the most promising science opportunities for advancement of food and agricultural [00:17:30] sciences? Again, very broad, very overarching and we're going to be recording these ideas and suggestions you have and we will take the suggestions back, and then as I said earlier would make sure that we consider these suggestions as most valuable when we craft our future NIFA priorities and funding initiatives.

We have a website nifa.usda.gov/nifalistsens. [00:18:00] Please go to that website and also there would be opportunity for us to continue to make these comments. As I said, gaps in forming priorities, determining what programs are redundant, and combining these NIFA employees in their internal listening sessions and priorities and ideas and suggestions that we've got. Hopefully, we

will be able to further strengthen our science [00:18:30] emphasis areas, which determine what programs NIFA is funding.

Continuing the investment in science, investing in science for transformed lives initiative, we do have electronic venue for your input as well, which would continue till December 1st. After today's listening session, if you go back and think, "Wow, we should have said this and we should have said that," or other colleagues may consider [00:19:00] few things, which you might have missed. There's still an opportunity for you all to provide your input through electronic mode, and as Jeanette was saying this is our third listening session and the fourth one would be in Washington Metropolitan area, which would be Greenbelt, Maryland.

We look forward to seeing our colleagues in that region, that part of the country as well, which essentially would cover the entire Northeast area. So again, thank you so very much, this is so [00:19:30] important for us that you took the time and came all the way to this listening session to share your wonderful ideas with us. We will certainly get back to you these web recordings as well as the transcripts as well as the overarching synthesis, which we'll do post these listening sessions. We will post that on the website so that you all know what not only people in this region have said but people across the country have said [00:20:00] in terms of advisement to NIFA as we set our priorities. I look forward to your presentations and I'll now hand the podium back to Dr. Jeanette Thurston and we look forward to the day.

Jeanette T.: Great, all right. Thank you Dr. Qureshi. All right, so some of my colleagues wanted me to fill the dead silence with jokes. There's a reason why I became a microbiologist, so I'm actually going to ask [00:20:30] some trivia questions of you and since we're a little bit ahead of time, you're going to have to entertain me with this. The first one is what federal agency is the people's department? In NIFA, people can't talk about this. The people's department, oh come on.

Female: USDA

Jeanette T.: USDA, that's right fantastic. Come on, that was an easy one, you guys all need to go back and get some more coffee because they get harder as the day goes on. Okay, [00:21:00] so we're supposed to start at 9:00, but Gene are you ready to provide your comments?

Gene Giacomelli: I'm always ready.

Jeanette T.: Nice and oh Gene is always ready, you know why? Because he's a Wildcat.

Gene Giacomelli: Yeah.

Jeanette T.: It's my pleasure to introduce Gene Giacomelli, all right, from the University of Arizona, College of Agriculture and life sciences. Gene.

Gene Giacomelli:

Thank you Jeanette, thank you everyone, Dr. Qureshi, thank you for organizing this [00:21:30] opportunity. This is a good opportunity to be here and I look forward to this discussion. Yeah, go Wildcats although at the moment I have to say I'm local at UC Davis doing a sabbatical leave, so we have to spread out a little bit. This will be the first stop of the bus tour that I understood that we're on today and I'll be your tour guide. My name is Gene Giacomelli, I am a professor in the Biosystems [00:22:00] Engineering Department at the University of Arizona. I'm also the director of the Controlled Environment Agriculture Center also at the College of Agriculture and Life Sciences at the University of Arizona.

My background is engineering but also horticulture. I like to think myself as an engineer who appreciates plants, not only just to eat, but what they can do for us, what they do for production agriculture. [00:22:30] But the stop, first stop is in controlled environments. CEAC, the Controlled Environment Ag Center, is a group of scientists and engineers that work together on education, on research, on outreach for the development of food production systems in controlled environments. A greenhouse is one example of such and we have worked [00:23:00] on producing the traditional tomato, lettuce, cucumber, pepper crops, plus many unique crops in terms of hops, in terms of strawberries. We're looking to blueberries, and other berry crops as well.

Along the way there has been other unique applications, controlled environments can produce crops almost anywhere at any time [00:23:30] and we've had demonstrations of facilities working at the South Pole in Antarctica inside the research center there to provide food for the scientists. We also are in the midst of a project for NASA to produce food on other planets such as when we arrive at Mars. That's some time in the near future we hope. The greenhouse, however, is here in production on earth. [00:24:00] If you enjoy fresh market tomatoes, you probably had a 60% chance that tomato you weighed came from a controlled environment. That is to provide temperature, humidity, light, carbon dioxide, and the nutrition to make a healthy plant, to make a healthy product for us to eat.

As an engineer, I appreciate the fact that in a controlled environment we can maintain the aerial environment around the plant [00:24:30] to what we need it to be to optimize its growth. Simultaneously, we can also control the root zone of the plant using hydroponics systems, not true water culture all the time but soilless culture to provide your nutrition for the plant to be healthy. All of these offer opportunities to the most recent applications in urban agriculture. I see this as the most unique time in [00:25:00] the history of the world where people, young people, old people have the opportunity who have never been in production agriculture to get into production agriculture.

You don't need grandpa's North 40 anymore, you can start out in a little corner in a garage, why not? Top priorities that I'd like to leave with you today is controlled environments [00:25:30] for producing food for all peoples at all economic levels and in all the locations around the country or countries. You

have done much with the SCRI, the Specialty Crops Research Initiative, and we appreciate that and the efforts that have come to develop the high tunnel industry in US.

The high tunnel is not [00:26:00] the fully controlled environment, it is a good start and I believe that the current producers of production agriculture in the field for vegetable crops will be transitioning using that as a complement to their production in their open field agriculture. Because greenhouses will not replace open field agriculture in any way, they will complement that and we need more efforts developed along those lines to [00:26:30] extend from high tunnels to fully controlled environments.

In looking at that, we can suggest that the promising science and engineering activities that could occur to enhance this further are to develop new varieties, to improve their productivity, to improve their nutritional value of the vegetable and other crops that can be grown in controlled [00:27:00] environments. To produce crops without the need or an excessive need of pesticides, so developed as it has been the integrated pest management programs. To recycle and reuse the water and the nutrients that are provided to the plant and not to distribute those into the environment but to make efficient use of water and nutrients.

An example being irrigated lettuce in the field, [00:27:30] it has about 10 times the amount of water needed per head of lettuce compared to a recirculating nutrient system in a controlled environment greenhouse. Then there is the question of organics and using organic fertilizers in hydroponics that needs additional work and study. We can reduce food waste in controlled environments because of the fact [00:28:00] that 95% pack out or better of crops grown in controlled environments are typical and even the 5% is still edible or very good product.

Engineering, developing systems that are monitored and controlled to provide the environment that is necessary for the plant and to even predict the quality of the plant or some difficulties that the plant may be getting into [00:28:30] in their environmental situation. Along that lines, then urban agriculture I mentioned so these are specific applications to solve food and nutrition, and food quality problems. Transplant systems are another area that can improve the production of field agricultural products. Transplants produced in the greenhouse, grafted transplants, these studies can focus on improving the capability [00:29:00] to take the product, the crop, out into the field and grow them in the more traditional way.

Then finally, we expect that food and food quality to improve the social network of communities, to improve their health and in essence have everyone enjoy what we come to appreciate of the quality of the products that can produce in all of production agriculture, but particularly in off season [00:29:30] times in controlled environment agriculture. With having said that, I'd just like to conclude that there are a number of universities around the country and around

the world, but most recently in the US around the country, several have engineering aspects associated with their plant science studies.

Ohio State University, Rutgers University, certainly also the University of Arizona. [00:30:00] But there are many more focusing on the plant science aspect, Michigan, Indiana, North Carolina, Florida, Texas A&M. and UC Davis, it's why I'm here in part. With that, I'll say that I am not speaking for all of my colleagues, but I know that they have similar interests and expectations as we move to the future and we look forward [00:30:30] to that as well. Thank you very much. That is yours.

Jeanette T.: So Gene was early and yeah, Gene if you want to stay up here just one moment, and anybody have any questions for Gene? We have a few moments for a question or two.

Gene Giacomelli: Yes sir?

Male: What's the kind of workforce that we need to focus on to achieve the vision [00:31:00] that you have?

Gene Giacomelli: We need students that have an appreciation for plants, not just because they look pretty and they taste good, but to understand the biology behind growing plants. That is developing now, they need people who have not had intercultural backgrounds. But we also need students who are technically oriented engineering students, the ability to put things together in a practical way as [00:31:30] our agricultural farmers have been doing for many generations.

Now, in a certainly highly technical situation where large investments in systems need to be operated properly to get the return on those investments, to get the yields that we expect and to reduce the resource inputs such as water and nutrients and still get those yields. So education is key and I'm sorry I didn't mention that during [00:32:00] the heart of my talk. Yes.

Gayle Taylor: Hi, won't you agree that one of the big challenges in this area is to move from-

Gene Giacomelli: I'll repeat the question.

Gayle Taylor: Thank you, Gayle Taylor, UC Davis. Would you agree that one of the big challenges in this area is to move from the nice leafy crops and one or two other foods that have been grown in these [00:32:30] controlled systems to tackle some of the more difficult food crops?

Gene Giacomelli: Yeah, that's the fun part. You're talking about flowering and fruiting crops being more challenging. The tomato may be one of the most difficult crops to grow in any controlled environment and that's been developed and tackled and understood, it can be done. The leafy greens are a very good way to start, lettuces and the microgreens, and the market [00:33:00] is very strong for them.

However, the market for the flowering and fruiting crops as that improves beyond tomato, as that improves, those understandings will come. They will be developed in part with support that comes from NIFA but also from R&D that's been done along the way for the past 20 years or so. Are [00:33:30] we good?

Jeanette T.: Thanks so much.

Gene Giacomelli: Thank you.

Jeanette T.: Let's give Gene one more round of applause. Okay, so next up Vicki Miller, is she in the room? Okay, how about, I apologize, I don't have very good light up here, Katie Panarella. Katie Panarella is here, so one more trivia question for you all, and this is [00:34:00] an easy one. What does NIFA stand for? Wow, does every one line of that. Everyone came in unison, the National Institute of Food and Agriculture, fantastic. Come on up. I'd like to welcome Katie Panarella, Nutrition, Family and Consumer Sciences Program and Policy at UCANR.

Katie Panarella: Okay, great, thank you. Good morning everyone. My name is Katie Panarella, I'm the director [00:34:30] of Nutrition, Family and Consumer Sciences Program and Policy with the University of California, Division of Agriculture and Natural Resources. I want to welcome you all to California and virtually. I really appreciate NIFA coming out today and giving us the opportunity so close to our home to discuss our Food and Agricultural Research, and Food and Agriculture Research and Extension priorities. I'm here [00:35:00] with several colleagues today that you'll hear from throughout the morning and afternoon, so I'll give a brief introduction of who you UCANR is.

For more than a century, California's \$47 billion agricultural sector has depended on UCANR in partnership with our UC campuses for the stream of new technologies and research breakthroughs needed to stay competitive and be responsible stewards of the land. The UCANR land grant mission [00:35:30] has delivered through several hundred academics conducting research on four campuses and nine research and extension centers and through over 50 county offices throughout the state.

We work closely with a wide array of partners and volunteers to deliver programs ranging from 4-H Positive Youth Development, to FNEP, to Master Gardeners and Master Food Preservers, to Integrated Pest Management, the Nutrition Policy Institute and the Water Resources Institute [00:36:00] for California. The UCANR has a strategic vision for 2025, and this guides the research and extension work of UCANR. It consists of five strategic initiatives and the one I'll talk about today is called The Healthy Families and Communities Strategic Initiative.

This is central to our programs in research serving youth, families and communities, what we call the Human Resources Programs. This includes 4-H Positive Youth [00:36:30] Development, Family and Consumer Sciences as well

FNEP in our community development work. Lauren Au is here today from the Nutrition Policy Institute and she'll be speaking after me on more of the Nutrition Policy piece within this initiative.

There are four issue areas within The Healthy Families and Communities Strategic Initiative, community development and public policy, food literacy and healthy lifestyles, promoting [00:37:00] positive youth development and scientific literacy. To start, community development and public policy was most recently added to this initiative, however, it's work that we've been doing for over a century. It really encapsulates the historic mission of cooperative extension to help local residents gain the power and means to shape their lives, families, and communities and sustain behavior change.

The priorities within this issue area are to create public [00:37:30] value by catalyzing innovation and community change by providing science based assistance and building strategic partnerships, informing public policy, and providing focus and direction for community coalitions and projects. Another priority is to promote community capacity building with underrepresented and new cultural audiences and other communities of identity in California.

The second issue area is food [00:38:00] literacy and healthy lifestyles. We aim to develop this area across the developmental spectrum from infant to seniors to promote a culture of health for all Californians. As you know, the landscape of nutrition has broadened over the last decade or so beyond obesity prevention. Not that we are at all finished with addressing obesity prevention, but now it includes creating healthy environments, improving food access, [00:38:30] promoting food literacy, reducing food waste, improving food safety and drawing linkages to chronic disease prevention in the face of so many uninsured low income families living in poverty especially in California with such a high cost of living.

Estimates suggest that nutrition and lifestyle related conditions are responsible for 75% of all health care costs and threaten quality of life, function, and emotional well being. Our priorities [00:39:00] in this area are to continue formulating research based recommendations but within the broader scope of nutrition for improving food literacy and physical activity opportunities in counties across California. Working with youth and their families, schools, youth serving organizations, recreation departments and other community partners. Our second priority is to create and evaluate comprehensive school and community interventions for better health in [00:39:30] counties across California.

The next two issue areas, promoting positive youth development and scientific literacy look toward 4-H Positive Youth Development as a model for in and out of school time to prepare youth for college and beyond. This looks to using scientific literacy as a driver to increase college and career readiness with underrepresented adults and youth and at the individual community and societal levels. [00:40:00] Over 80,000 students don't graduate each year, we need to

contribute to building a vibrant and well educated workforce with the leadership qualities to help build stronger communities. Youth development programs serve as a pipeline directing both rural and urban youth to pursue higher education with the potential for careers in food, agriculture and environmental management.

One potential solution to deepening concerns over access to a trained workforce for the food and agricultural [00:40:30] sector is a much broader utilization of 4-H and other associated youth programs. As you can see, the opportunities for effective interventions in these areas are extensive. Integrating across nutrition, agriculture, youth development, parenting and community development through linking all parts of the ANR network at the campus and community levels is essential.

Nurturing these collaborative efforts among colleagues [00:41:00] in nutrition community and Child development, sustainable food systems, medicine, nursing, education and science literacy to successfully address issues that directly impact the nutrition and health status of California's population are equally essential. And engaging in new populations in all programs that have traditionally may have not been involved in these programs. As well as engaging our small and mid-sized [00:41:30] farms in supporting greater consumption of locally grown food.

NIFA funding enables ANR's considerable infrastructure and academic expertise to expand along with the opportunity to pursue new ways of partnering within and outside of the University of California to develop research based solutions and realize opportunities for healthier California. Thank you. Sure. [00:42:00] Any questions? Yes.

Lauren: Hi Katie, thank you.

Katie Panarella: Hi Lauren.

Lauren: I was wondering if you could expand a little bit on 4-H and talk about the science literacy that you're speaking of? Like what type of training that entails and really how are you targeting this underserved population?

Katie Panarella: Sure, I [00:42:30] can speak to that a little bit. It's not my program directly but I can talk about a little bit how 4-H is looking to expand with their Latino Initiative as well as their diversity initiative and there's tremendous potential for them to partner with FNE. We're always looking for ways to engage underrepresented audiences and low income youth through, FNEP has been one example. So [00:43:00] we partnered on a few different curriculum, choose health food and fitness, fun and fitness is one of them out of Cornell. That is one way that we've tried to engage other low income audiences to be more involved in 4-H. Anything else? Okay. Thanks everyone. I think you have my agenda.

Jeanette T.: Okay, thank [00:43:30] you. There you go. Well, thank you very much Lauren ... Katie, I'm sorry, next we have Lauren. Next we have Lauren Au, and the obvious, she's also from the University of California, Nutrition Policy Institute, so let's welcome Lauren.

Lauren Au: Thank you. Well, welcome everyone. I'm very happy to be here. [00:44:00] My name is Lauren Au and I'm from the Nutrition Policy Institute at the University of California, Division of Ag and Natural Resources, and Katie is one of my colleagues. She did a great introduction of ANR and sort of a breadth of what we cover. Specifically, NPI is comprised of about 40 staff and students and we work on various research projects that are funded by multiple funders spanning private foundations to the federal government [00:44:30] including NIFA. Today I'll give you a really brief background about NPI and the work we do and I'll discuss our top NIFA priorities and areas that we see are the most promising for the future of Nutritional Sciences. The slides work, great.

NPI's mission is to improve nutrition in low income communities by engaging in research and communication [00:45:00] that informs, builds and strengthens policy. We cover a variety of topics, we focus on food insecurity, obesity, diabetes and other chronic diseases, high-risk communities such as low income or racially diverse communities and children and families. We really cover a broad spectrum, [00:45:30] we focus on multiple sectors from the Supplemental Nutrition Assistance Program, specifically, SNAP-Ed to Women, Infants, and Children or WIC, Child-care, Schools and Communities. This is really why I really enjoy working at NPI is because we cover all of the federal nutrition programs and looking at ways to strengthen and to improve them.

What is our top NIFA priority? It's to increase investment and translational research [00:46:00] that examines ways to improve population nutrition and health particularly among the youngest children. Katie mentioned earlier that nearly a quarter of US children are overweight and obese by the time they start kindergarten, and by the time they are adolescents nearly a quarter of them have elevated blood sugar or blood glucose levels, that are indicative of diabetes risk. There's really an urgency [00:46:30] to start before school age. Dietary intake and behaviors tend to track from early age, as early as one to two years old, so intake is largely established very early on in life. Our first priority area is for the advancement to focus on research that optimizes current investment in federal nutrition programs.

Programs such as WIC and Child-care have [00:47:00] shown success in improving nutrition and young children, however, there needs to be more translational research to understand ways to improve these programs so they can continue to grow healthy food options. We have conducted several studies at the National as well as California level evaluating the effects of changes to the WIC food program. That serves many low income infants, children and pregnant women. We proved the [00:47:30] benefits of changes in the food supply and today children on WIC, nationwide, are able to eat more fruits, vegetables, beans and low fat products. Also, we've conducted two randomized trials

showing that brief online education in WIC can effectively lead to long-term health behavior changes such as reducing sodium intake to help prevent chronic diseases.

Another example of how evidenced based research [00:48:00] can be used to support healthy changes is in the Child and Adult Care Food Program or CACFP. In 2008 and 2012, we conducted state wide surveys to child care centers and family day care homes in California that show that CACFP sites provided better nutrition than those not participating in the program. But there was still room for improvement in terms of fruits and vegetables, whole grains and beverages. Results [00:48:30] that helped inform the 2017 CACFP meal pattern revisions.

We conducted another statewide survey in 2016 to identify barriers and solutions to inform the kinds of training and support needed, so childcare centers and homes are further able to implement the new changes. Our second priority is to investigate how best to align policy, systems, and environmental change interventions [00:49:00] with targeted education to produce population behavior change. Katie mentioned FNEP and SNAP and those are really including a broad system of environmental change with nutrition education.

More than a decade of research has shown that comprehensive changes to physical and social environments coupled with strategic educational messages can be effective to improve population, diet and activity behaviors. [00:49:30] However, we still have much to learn about which combinations of what interventions will have the greatest impact and how really to scale them up for success.

NPI is evaluating SNAP-Ed funded community change effects in California. These efforts aims to make it easier for SNAP eligible people to eat healthfully, be more active and improve their food security status. The interventions are designed to couple nutrition education [00:50:00] and community change efforts and NPI's objective is to better understand the most optimal and feasible combinations of activities to produce behavior changes and improved health outcomes.

Finally, our third priority area is to enhance integrated research across the agriculture and nutrition spectrum. Food hubs help Farm to School programs and food service professionals get good healthy local [00:50:30] whole foods to our nation's students. However, evaluation examining scaling up these programs is limited. In Riverside, California, we are working on an innovative model of distributing fresh locally grown produce via a food hub operated by a large school district. If proven effective, this model could be replicated to develop new markets for specialty crop growers, while improving nutrition for low [00:51:00] income communities.

This model takes advantage of the whole school infrastructure to buy food and give small farmers an opportunity to get started. It also develops new markets to growers by producing and by bringing produce to small school districts,

corner stores, child care centers, really markets that couldn't do it themselves. Finally and most importantly, it increases availability of healthy foods for low [00:51:30] income people.

In summary, our top priority is to increase investment in translational research that examines ways to improve population nutrition and health. The three areas that we see are most promising for future advances in nutrition are focusing on research that optimizes current investments in federal nutrition programs, aligning policy systems and environmental change with education and finally enhancing [00:52:00] integrated research across the Ag and nutrition spectrum. Thank you. That's my contact information and you're free to email me if you have any questions.

Jeanette T.: Thank you Dr. Au and Katie for the conversation on nutrition. I was wondering if you would just step back a second and explain the difference [00:52:30] between calories and nutrition? Because I think the USDA traditionally has done a really good job at helping us produce calories more efficiently, right? Wheat, soy, rice, corn. Even if you live in a food desert, you have plentiful access to those products but not necessarily nutrients or nutrition. I was wondering if you would just kind of talk about those differences.

Lauren Au: That's a good point talking about [00:53:00] what's available in some areas that's not available in others. I will say in some of the work we do we're really trying to focus on highlighting the nutrient dense options and that might be from the example of a food hubs in the schools as trying to bridge those nutrient dense options. Two areas that may not have it so readily available. We also try to promote nutrient dense options [00:53:30] in all the federal nutrition programs and so that's where our nutrition education is really tied in, in WIC and in SNAP-Ed. In terms of the food supply, that's sort of not our area, we focus on what happens when people are at the grocery store, when they're trying to choose their options and try to make more healthy options and decisions for them. I think there's another [00:54:00] question over there.

Female: It's really more of a comment to say that the work you are doing is absolutely fantastic and necessary, but we have to admit that modern plant breeding largely relates to the calories question is not focused on nutritional content and there's an absolutely gaping hole that we need to address, which is about densification in nutrient from crops. We can [00:54:30] do all the interventions we like in behavioral changes, but we have an opportunity to increase the basic value, the nutrient value of food, and I think that's really important to continue to acknowledge and make sure it doesn't slip away.

Lauren Au: Yes, thank you for that comment. I think we're all [00:55:00] set?

Male: I have a clarifying question on translational that your recommendation for, well, translational research, are you referring more towards we should be investing more in the translation of research, part research, or to invest in the research of translation?

Lauren Au: That's a really great question. The best example of that I have is in NIFA's programs, their childhood obesity grants, is where it's more applied. So trying to take [00:55:30] the information from let's say the dietary guidelines for Americans and making them practical and feasible in low income communities.

Male: Thank you.

Lauren Au: Thank you.

Jeanette T.: Okay, very good and thank you Lauren. Is Vicki Miller, was she able to join us? Okay, Scott are you ready? Is Scott out there? All right Scott, all right so we have Dr. Scott Reed [00:56:00] from Oregon State University.

Dr. Scott Reed: Thank you, good morning. For the record I'm Scott Reed. I'm trained as a forester and an economist. I'm here today at the request of the Extension Committee on Organization and Policy, ECOP, that represents the Cooperative Extension section of the board on agriculture assembly within the association of public and land [00:56:30] grant universities. My position at Oregon State University is as vice provost for university outreach and engagement and I service director OS Extension Service. In that capacity, I'm active nationally in developing leadership, marketing, and communication to advance programs, private resource development and innovations that allow our partnerships to honor the role of engagement in co-creating solutions to increasingly wicked issues.

Most recently I have driven additional thinking at Oregon [00:57:00] State towards the role of innovation in stimulating new ways of thinking to enhance our collective ability to serve society. It speaks volumes that NIFA is listening to stakeholders about their top priorities for Food and Agricultural Research, Extension, and Education. Thank you for investing time and energy in this process. As you know the stakes are high with our world's population heading for nine billion by 2050 and beyond the sheer volume of additional food that will be required. We're challenged by increasingly complex circumstances.

[00:57:30] As America becomes even more urbanized, we see that people are disconnected from production practices leading to questions about environmental implications of farming practices and more preference for locally produced food. Climate change and increasingly variable weather continue to bring challenges to the availability of and competition for water, the emergence of invasive pests and continual adaptation of production practices. It is in this context that I respond in NIFA's two questions. [00:58:00] The first question asked about top priorities.

ECOP engaged the entire cooperative extension section answering this question which identified five strategic focus areas. Nutrition, health and wellness is the first one, second, positive youth development, three, water, four, food production and food security, and five, community development. Now each of

these areas provides an enormous range of problems for NIFA to consider, as well as the challenge [00:58:30] of apportioning resources among competing needs. In this respect, I urge your mindfulness of the role in specific strengths of capacity and competitive funds. As you've heard from others, capacity funds leverage state appropriations that match the federal allocation, local funding and volunteer time that dramatically expands the working power of federal funds.

These resources provide a base of fundamental talent for unique state by state stability, [00:59:00] responsiveness and ability to seek competitive funds. One great example of the use of capacity funds is our 4-H youth development program, the nation's leading such effort that places six million young people on the trajectory to success. These same youth frequently matriculate in NIFA supported educational programs and become lifelong learners and leaders that help advance the role of science based knowledge driven innovations in food and fiber systems. [00:59:30] I hope that NIFA recognizes the distinctive leadership role that we play together around positive youth development.

Competitive grants round out a well-functioning funding ecosystem by providing in-depth long term research and extension approaches that provide the foundation for science based curricula and community engagement. Here in the western United States, the context for NIFA's programs is unique. Over 80% of our population lives in urban centers, separated by expanses of sparsely populated [01:00:00] rural areas. The public owns nearly half of this land base that covers five time zones, shares borders with Canada and Mexico and includes diverse ecosystems of great plains, high mountains, arid deserts, rain forests, frozen tundra, tropics and miles of coastal areas.

The Western Extension Directors Association encourages NIFA to be a thought leader in science based decision making in policy areas such as [01:00:30] energy, climate and coastal issues, priorities that transcend boundaries of states, programs and demography. Of special value to the west are issues related to fire, water, climate change population trends, and invasive pests. The Western directors have filed a written report to NIFA and I call your attention to the few of the points made there. Extension should be considered a component of all NIFA grants including funding awards with the basic research emphasis.

It's time to flex [01:01:00] our positive youth development muscle even more. 4-H and youth development could be integrated into AFRI in some meaningful productive way. SNAP-Ed funding should be considered for NIFA's direct delivery by extension as a part of a comprehensive nutrition educational program. NIFA should support broadband initiatives for under connected areas in states and territories. NIFA should defer to institutional policies and interpretations of uniform [01:01:30] guidance, including but not limited to the frequency of time and effort certifications.

Finally, planning and reporting processes must allow for state level flexibility and innovation, specifically that capacity funds not be reported by project or program. Many institutions are not equipped to report in this way and to do so

would have burdensome financial, programmatic, accounting and human resource implications diverting time and money away from valued research and extension work. [01:02:00] The second question addresses science opportunities. Some have signaled the dangers that I agree with in what is regarded as the delegitimization of science, especially, as it relates to divisive public issues such as climate variability.

Thus through peer reviewed scholarship, NIFA's army of scientists can provide objective insights into tackling medic evaluation of what's regarded as big data and big datasets. Such an approach honors knowledge [01:02:30] wherever it exists while vetting its application in designs and systematic processes. Secondly, few contemporary problems are defined by a single discipline, thus requiring that NIFA along with the university system develop methodologies that integrate perspectives in transdisciplinary ways. This is especially important at the intersections of food production and healthy populations.

Global food production is another deserving area for science. Other countries are investing [01:03:00] equal or more resources into these same issues and NIFA can play a role in optimizing the development and application of science especially in developing countries. In the face of changing landscapes we need resilient agriculture production systems that can efficiently adapt to local circumstances. Our NIFA University partnership is uniquely positioned to draw upon our distributed strengths.

Finally, NIFA has the ability to maintain an emphasis on a national [01:03:30] issue until it is solved. One example is antimicrobial resistance and its many dimensions. By seeking and applying long term solutions, NIFA's role as a public service agency is strengthened in developing healthy ecosystems, healthy economies, and healthy people. Thank you very much for the opportunity to provide this input. Thanks.

Male: [01:04:00] Thanks Scott for your organized thoughts on that. Just from your perspective for the broader nasty problems have to be attacked by larger integrated projects, how do you see the balance between foundational investments in smaller grants for faculty versus the larger initiative type of grants and approaches?

Dr. Scott Reed: Yeah, yes and yes. The way you framed your question points out the value of doing both kinds of work. [01:04:30] I particularly like to see individual PI focused work, especially, at the front end of their careers when they are establishing their reputation and their respective strengths and have become recognized as powerful team members subsequently in larger more integrated funding.

Male: Thank you Scott. Great, great presentation, great ideas, thank you so much. I'd like you to expand a little bit on your idea [01:05:00] of including or incorporating 4-H and PYD into AFRI, can you expand on that you talk a little?

Dr. Scott Reed: I offer it more as a concept that deserves some additional conversation and thinking about where it might specifically fit, but I continue to observe our national leadership position and the way in which our positive youth development program, largely 4-H, but not only 4-H is embedded in [01:05:30] unrestricted capacity funds and sometimes not held out. At Oregon State, about 20% of our Smith-Lever Appropriation finds its way into our positive youth development program that's more than matched by state appropriations. If you ramp that up nationally, I suspect we have a \$2 or 300 million positive youth development program that's not often rolled up and given that kind of attention.

Jeanette T.: [01:06:00] Okay, so we're pretty far ahead. Any chance Vicki's able to join us? Okay. All right, so you're going to have to deal with my trivia again. What president signed the moral act into law?

Female: Abraham Lincoln.

Jeanette T.: That's right, Abraham Lincoln, and we need to actually have candy up here. I should be throwing candy [01:06:30] at you as you get these correct. Actually, just to follow up on Scott's nice comments, one thing that you're all very well aware of is that a public investment in agriculture research has resulted in very large economic benefits with annual rates of return between 20 and 60%. So I thought that was a nice fact to share with you today.

All right, so one more since we have a little bit of time and I just learned about this morning. Anybody know what a Waterloo Boy is? You really will get a candy if you tell me [01:07:00] what this is. It's the very first ... Dr. Chiapas knows. It's the very first tractor that was put into production, they only sold a few. But the reason why I stumbled upon that, for those of you who might be in the DC area in the next year, our own Smithsonian's National Museum of American history has the American Enterprise exhibition for 2018 and they're calling it the year of the tractor.

[01:07:30] You can see a 1918 Waterloo tractor at the Smithsonian Museum, so I thought that was a nice little factoid to share with you and I'm sure all of us are going to journey on over to the Smithsonian Museum to see that tractor. Okay. so we are ahead of time and is Nina Ichikawa ... I guess you have to help me on your last name.

Nina Ichikawa: Ichikawa.

Jeanette T.: Ichikawa.

Nina Ichikawa: Yes, Ichikawa.

Jeanette T.: Okay, so [01:08:00] we have Nina here with us today from Berkeley Food Institute, University of California at Berkeley. Let's welcome Nina.

Nina Ichikawa:

Good morning everyone. Thank you so much and thank you NIFA staff and experts for coming all the way out west, we really appreciate it and we're really delighted to share information with you today. My name is Nina Ichikawa, I'm the Policy Director at the Berkeley Food Institute and [01:08:30] we are an interdisciplinary research institute established in 2014 as a collaboration between seven schools and colleges on the UC Berkeley campus. Those schools are other colleges of natural resources, public health, law, public policy, journalism, business and the College of Environmental Design.

In terms of interdisciplinary research, we are established with that as our forefront mission. We fund research on our Berkeley land grant campus in collaboration often [01:09:00] with our UCA and our colleagues, we fund undergraduates, graduate students, ladder rank faculty and groups of faculty working on key issues in food systems. I could talk for this whole time about what we do, but I try to take the questions very literally about our one top priority in food and agriculture. But I encourage everyone to look at our website at food.berkeley.edu to find out more, because we are working on truly a tremendous [01:09:30] array of food systems issues, food and agriculture systems issues and both the natural and social sciences.

Based on our work and hearing from experts in the field, stakeholder groups whom we regularly engage around the country and around the world, we've really come to a conclusion that we want to share with NIFA today being there as a top priority for us right now is research on labor. This is really a key issue here in California and this is included [01:10:00] but not limited to the impacts of immigration policy on farming communities, the growth and possibly uneven enforcement of the H2A program, housing for farm workers, healthcare and education for farm worker families, and how shifting regulatory industry trends have impacted farm and food workers.

It is undisputable that the entire agriculture economy is undergoing transformation right now, due to a variety of factors including political, economic, [01:10:30] and environmental. It really troubles us that immigration and farm workers are being used frankly as a political football when we find that the agriculture is suffering, agriculture and food businesses are suffering as a result. Thus far, agricultural labor research has been largely focused on technological adaptations to labor challenges. While important, technology cannot and will not be the only solution.

We will always need humans to bring American agricultural [01:11:00] prosperity to the world, how much will these humans be paid? According to UC Davis's agriculture economist, Philip El Martin, there is little relationship between farm wages and consumer prices for fresh fruits and vegetables. Why are average wages for a full-time agricultural worker in California at around \$16,500 per annum? What citizenship rights are agricultural workers entitled to after performing what is often very dangerous [01:11:30] and difficult work over a lifetime?

What about the conditions for workers in emerging industries like grocery delivery and meal kits? This type of research is very difficult to fund, despite its importance to the agricultural and overall economy. One in five private sector employees in the US work in the food system. Here in California, our \$34 billion fruit, vegetable, and horticulture industry are particularly reliant on farm labor, disproportionate [01:12:00] to other states and to the nation as a whole.

We propose that NIFA greatly increase its work on employment and work in order to protect the long term prosperity, stability and safety of our farms, ranches, dairies and fisheries. Finally, just to conclude, many people have termed this and actually our Secretary of Agriculture, Karen Ross, has talked about the dignity of farm labor and professionalization, really trying to ... She came to Berkeley [01:12:30] about a year ago and I was surprised and impressed that about two thirds of her talk was on this issue and that we need a deep dive to consider what is the future of farm work and how can we honor those that are doing it, professionalize it. And give it a pathway towards the future for those people that want to continue working in it and integrate that into our educational system.

[01:13:00] That is what we're working on, we have a few research projects underway right now, but frankly the research funding landscape is pretty difficult, so I'd be open to any ideas from USDA and other government entities on how we can address this better. Happy to take any questions and thank you again for giving us time today. Yes, please.

Male: [01:13:30] I am interested in the little bit in the history of your consortium, so could you please expound on how you got everyone in such a very interesting combination of institutes within Berkeley to come together to work on these issues? Can you give me a little bit of history on that?

Nina Ichikawa: Sure.

Male: I forgot my second question, but let's start with that.

Nina Ichikawa: We can come back to it, yeah. [01:14:00] Well, you know Berkeley is a ... Many people don't know Berkeley is actually the original land grant of the UC system, so we've had biophysical and social science research on Ag going on for centuries now since our establishment. And really just energy was growing to have an interdisciplinary place to work on food systems. I actually was an undergraduate at Berkeley a few decades ago and put together my own major, [01:14:30] interdisciplinary major, but it was because Berkeley does allow interdisciplinary study. But there was not an institutional home, so credit to the deans and the school leadership and we actually have those seven deans sit on our executive committee.

They really felt that it was a gap in scholarship in this country. Many of the institutes working on food are either on the public health side or the natural

resources side, and we felt it was very important to bring both to the table as well [01:15:00] as law and public policy because they're so important in our food system. So not everyone always understands each other but we try and that's our dedication into interdisciplinary. It really emerged out of a landscape analysis of similar institutes around the country and what we felt was needed next.

Male: [inaudible 01:15:20].

Nina Ichikawa: Great.

Male: What have been your traditional sources of federal or state funding for the projects that you've [01:15:30] done?

Nina Ichikawa: Great question, we're actually, our institute itself is almost entirely privately funded right now. Some of our researchers, we have 150 affiliated faculty and we have worked with a few of them on both federal and state grants. Some of the grants that they have received and are working on are a beginning farmer management development program, which we think is fantastic administered by NIFA. Also, AFRI foundational grants, especially, the [RENRI or BENRI 01:15:57] program which has changed names but it's also [01:16:00] an agroecological holistic approach to Ag systems research, especially, across research grants, our affiliate faculty have been recipients of.

Let's see, and also actual ... There are other things in the hopper that we're excited to announce soon, but for the most part actually the private sector has really stepped up and we're grateful for that but we would like to [01:16:30] find more interdisciplinary approaches to whole systems of research. It was also mentioned by my other colleagues in talking about food hubs home to school. If we're really looking at different parts of the food chain, certain RFPs can be too narrowly directed. Looking at externalities, environmental, economic, or like we said immigration law, these other types of externalities can be hard to just put into [01:17:00] one research bucket. Thanks.

Male: Thank you for the great comments.

Nina Ichikawa: Thank you.

Male: Just a comment to engage more students into this enterprise of yours which is beautifully interdisciplinary. NIFA has a program called REEU, have you heard of that program?

Nina Ichikawa: No.

Male: It's called Research and Extension Experience for Undergraduates. REEU is a funding [01:17:30] which NIFA provides to undergraduates, so that they can take advantage of experiential learning through internships, externships, study

abroad. Going from one institution to another, going from an academic institution to industry or policy, or government entities. It's a great program which I thought I'll bring it up to your attention at this point.

Nina Ichikawa: Fantastic, thank you. I will look into that. Well, one that's also related that some of you may not know about, [01:18:00] a pilot program that's begun by the UC system is graduate students in extension. It is a grant program that started at our campus for graduate students, PhD students to consider careers in extension and they get a six month or one year grant to further their research and they give presentations. They actually invited me to come to speak on policy issues and it's a really exciting pipeline that we are developing. Many students want to work in extension, so we're really excited about that [01:18:30] but adding undergraduate possibilities is really exciting as well.

Female: Hi Nina, great comments.

Nina Ichikawa: Thank you.

Female: I did want to mention that a lot of your comments focused on immigrant farm labor, but I wanted to note that those of us who teach undergraduate and graduate students in agriculture that we struggle with the same things. People are really excited about learning agriculture as a profession, but placing them into professional positions where their expertise is recognized [01:19:00] and they're paid a fair and living wage, it's an issue that we struggle with at the undergraduate and graduate level as well.

People are super excited about learning how to grow their own food, learning how to grow food commercially at Oregon State University. We have over 200 students that are part of our Organic Growers Club, and we're constantly wondering how can we place them into positions in organic agriculture that will compensate them for their expertise, their knowledge, the contributions that they have to give.

Nina Ichikawa: Absolutely, [01:19:30] some of the other, I completely agree, some of the other research we're looking at actually have a major project on land access and individual and structural barriers to land access. Because that's a huge issue for students that have received training and want to go on to own their own farm. We're very interested in land transition and land access. Yeah, I completely agree, it's an issue that we need to consider and many of our students come from farm worker families and do want [01:20:00] to continue ...

Bridge their academic expertise with the farming, real world farming expertise that they already have and we'd like to provide practical job opportunities for them. Thank you for that comment. Well, thank you very much for your time, I really appreciate it.

Jeanette T.: Okay. Thank you Nina. Do we have Michael Lairmore? [01:20:30] Okay, fantastic, we have Michael Lairmore next from the School of Veterinary Medicine also University of California.

Michael L.: Well, thank you very much. It's my great pleasure to provide remarks from the University of California Davis School of Veterinary Medicine and I'd like to thank NIFA for the opportunity for this listening session. The UC Davis School of Veterinary Medicine has shaped the field of veterinary medicine from dynamic educational programs to uncovering [01:21:00] solutions for emerging diseases of animals and humans, to sharing that knowledge to other communities worldwide.

The school trains tomorrow's veterinarian and develops leaders in various medical practice, higher education, public health research, disease control, food safety, environmental protection, and biotechnology. We're global leaders in veterinary medicine. NIFA is a vital part of our mission in the health, to really advance the health of animals, people, and the environment which is our mission.

[01:21:30] Veterinarians are uniquely qualified to be key players in the field of food safety and security, environmental quality and public health. In the area of ecosystem health, veterinarians are engaged in interdisciplinary research on behalf of the people and the animals. This breadth of involvement enables them to be valuable resources in food safety and security, disease control, and prevention diagnosis, treatment of disease, including those associated with environmental contamination.

Essential to [01:22:00] the advancement of food, animal, agriculture are discovery and scholarship focus on management behaviors as well and practices that impact the ecosystem health. In this regard, we identify our top priority efforts to develop a data driven understanding of how these changes in management practices influence animal health, environmental health, and human health. The most promising opportunities to accomplish this priority are four areas I'd like to [01:22:30] identify and then identify also how they link to our NIFA partners.

The first one is in innovations and data driven methods that allow monitoring of antibiotic resistance in field situations, and specifically how these changes and management practices influence animal and human health outcomes. This area is complementary to animal health and disease research programs in NIFA, which promote animal health research at accredited state veterinary [01:23:00] schools or colleges, or agriculture experimental stations. Monitoring animal health and preventing animal disease outbreaks is vital to the economy and safety of our food supply. Production of healthy livestock ensures safe food supply and keeps consumer prices stable.

So animal disease outbreaks that cost the country millions of dollars due to animal slaughters or trade interruption or subsequent disease eradication

efforts are costly. Animal diseases and human health are [01:23:30] implications adversely affect the public health, global trade and the stability of the agriculture segment of our economy. NIFA's programs that support veterinarians and scientists in these efforts to guard these diseases are critical to this effort.

In addition, our California Animal Health and Food Safety Laboratory System, which answers in a very potent collaboration with our State Department of Food and Agriculture is collaboration and answers through [01:24:00] the veterinary school is synergistic to the National Animal Health Laboratory network, which is vital to this emphasis. The US livestock and food safety sectors, which accounts for more than 100 billion in annual cash receipts are under continually threat by outbreaks of both foreign and emerging animal disease. Since 2002, the Norms Network is credited with cooperation and linking efforts like we have here in the State of California to NIFA and USDA.

[01:24:30] This area also is aligned with the Food Animal Resistance Avoidance Database or FARAD, which is USDA sponsored service whose primary mission is to help producers and veterinarians to prevent and mitigate illegal and harmful residues of drugs, pesticides, biotoxins and other chemical agents that may contaminate food of animal origin. FARAD collects and analyzes this data and scientifically a database and we have one of the FARAD centers here at UC Davis within our [01:25:00] school. This is extremely helpful for helping manage and avoid things like overuse of antibiotics. The second area is increase training opportunities for pre and post doctoral students to engage and focus on areas of research.

This area is synergistic with the veterinary medicine loan repayment program, which is critical to help offset loans for those qualified eligible veterinarians who agree to serve in NIFA designated [01:25:30] veterinary sorted situation areas for up to three year periods of time and that's an extremely important program. As well as the veterinary services grant program, which is a newer program to relieve veterinary shortages and support veterinary services in rural areas.

These grants are competitively basis and are very strong and supportive of this effort for training as well as outcomes of those that are trained. I would point out that a veterinary medicine student population is 80% women currently [01:26:00] and represent a highly educated work and STEM workforce. This aligns with their women and minorities in science and technology mathematics grant program in NIFA. The program is a competitive grants program to support research and also extension projects that will increase participation of women and I would like to point out the veterinary medicine is poised to supply that workforce.

The 30 areas research to develop effective and comprehensive monitoring [01:26:30] and surveillance systems to effectively controlled food borne illnesses. This area closely lines with AFRI's food safety challenge area, which focuses on societal challenges to ensure a safe and nutritious food supply, while

maintaining our competitiveness in agriculture. So in order to sustain an estimated population of nine billion people in the world, we'll need to double the production of safe nutritious food and this area of research is vital to support that effort.

[01:27:00] The final area is control of endemic diseases and the threat of transboundary animal diseases, which is a top priority including the development of new diagnostic assays for early recognition of pathogens and the development of new vaccine strategies to control the transmission of pathogens from animal to animal, but also animal to people. This is directly aligned with the AFRI food security challenge area, which focuses on the societal challenge of keeping [01:27:30] America's agriculture competitive and also to end world hunger by ensuring the availability and access of safe and nutritious food.

By 2050, world food supplies will need to double to match that challenge. The long term goal is sustainable increase in agricultural productivity and the availability and accessibility of safe and nutritious food. I would point out that all four of these areas that I've mentioned of priorities are all well within and congruent [01:28:00] with the Agriculture and Food Research Initiative or AFRI, the nation's leading competitive grants program. And helps mitigate the impacts of things like climate variability, ensure food safety for food security and train the next generation of agriculture scientist. I'd like to answer any questions related to that. Thank you again.

Male: [01:28:30] Thank you very much. I'm so glad to hear your endorsement about some of the programs you've mentioned especially the NOR program or the BMLRP and the new veterinary services grants program as fair. We take a lot of pride in ensuring that those programs continue for the reasons you have truly mentioned, so I truly appreciate you acknowledging the importance of those [01:29:00] programs.

Michael L.: Yeah, it's a very important partnership with the universities and other institutes are doing this research.

Male: Can you expound a little more on what you are thinking of when you talk about transboundary?

Michael L.: Yes, these are things that don't respect borders, Avian Influenza is a classic example. We're using [01:29:30] satellite data and land set data to monitor the water supply within California, but also the reflectivity really monitors the wild bird population who comes down on the Pacific flyway. They don't respect borders, we can't help them do that, but what they do carry is sources of Avian Influenza, which of course naturally we're very concerned about as NIFA for high path avian influenza, also as a reserve for human influenza. That would be [01:30:00] an example of a transboundary disease.

Male: What of domestically within-?

Michael L.: Well, another one would be the threat of things like foot and mouth disease. Foot and mouth disease is we plan for it, we run a lot of computer based modeling using surrogates for foot and mouth and disease. But we know that it's we're only one mistake away from having that in this country and it's of grave concern. So that would be one of the most economically devastating diseases. [01:30:30] Currently, we're very fortunate in the United States to be free of foot and mouth disease but that would be another example. All right, thank you very much thank.

Male: Thank you very much.

Jeanette T.: All right, boy, we're ahead of schedule. How many folks want to take an early break? Oh, Dr. Qureshi, [01:31:00] you forgot to introduce yourself. We're going to let Dr. Qureshi come up right before the break and introduce himself and tell us a little bit about your background? How long you've been at USDA? Where were you before that?

Dr. Muquarrab: And then we want everybody to participate.

Jeanette T.: And then before you get a break, actually, I forgot, we all need you up here, so we can take a picture of everybody together. Okay, Dr. Qureshi.

Dr. Muquarrab: Good. Yeah, I got a message from my team that while they all introduce themselves with their academic and [01:31:30] subject matter expertise background I forgot to do that. I'm also not a federal bureaucrat like some of you might think. I'm a veterinarian, I have a doctorate of Veterinary Medicine degree myself, Masters in microbiology and PhD in immunogenetics and immunotoxicology. I was on the faculty of a major land grant university, can I say the name?

Jeanette T.: Absolutely.

Dr. Muquarrab: Well, I was at Cornell as well as North Carolina State University for, [01:32:00] oh gosh, about 20 plus years before I moved to USDA. I was the division director for the animal systems and now I'm the deputy director of NIFA. Where the institute I manage is some of the comments we heard really are very pertinent to the programs which are in my institute for example 4-H. We are the headquarters for 4-H. I'm actually wearing a 4-H tie, [01:32:30] so hearing about 4-H and PYD was music to my ears.

We have another division called Family and Consumer Sizes, we heard a lot about some community in nutrition and health based priorities, community vitality, healthy living, all of those programs, rural development. We have several programs under regional rural development centers in my institute. Then [01:33:00] the third division which I have in my institute is actually

education, and believe me or not, USDA and NIFA, NIFA actually is almost 80% of USDA's formal and non-formal education is housed in NIFA. We have an education portfolio which really spans from K through 20, some of the things Gene you were mentioning, pre-doc and post-doc program. Some undergraduate programs I mentioned earlier, but also K through [01:33:30] 12 and K through 14, which includes a lot of community colleges.

We have more undergraduates than community colleges now for ecologists. That's a tremendous resource for us to tap into and to bring into our mission related workforce and next generation of scientists development. Also, a huge portfolio of minority serving institutions, 1890's, 1994's Hispanic serving institutions, insular area, less conative, Native Hawaiians, all of those portfolios. So NIFA is a very, [01:34:00] very programmatic and very diverse entity.

That's why all the science emphasis areas, we have nine science emphasis areas and I can almost guarantee you that all of you who are sitting in this room and listening can see themselves into those science emphasis area. That was the reason we wanted to cast a very broad net to ensure that we get your feedback on not just one aspect of what NIFA does. [01:34:30] Some people mention AFRI as our flagship program too, but our portfolio is \$1.5 billion, it's almost and which is research, education, and extensions.

We really, really truly value the feedback we're getting today from your on extension, nutrition and health, culture of health, PYD, competitive programs, capacity programs, veterinary programs, animal health and management and a microbial disease. All these terms are really, [01:35:00] believe me or not, are our top priorities already. But hearing from you and how do we go from here forward is what is the challenge we will be tackling with your help? Thank you so much, is that enough introduction?

Jeanette T.: Awesome, that's perfect. Thank you Dr. Qureshi, so for those of you online we're going to take our break now. We'll be back at 10:30 here in the list, that's 12:30 I believe [01:35:30] Central Time and 1:30 Eastern time. All the participants here, the best lighting is actually over by the food, so we can get you over by the food. That's going to be hard, you're going to want to touch it, but just wait until we snap a couple of quick pictures. Thank you so much.

Speaker 1: All right, so welcome back to NIFA Listens: Investing in Science to Transform Lives. We're going to get started right off the bat with Wakeena Scott Konkom, from Prairie View A&M University. Is he here with us today? It doesn't look like it, so we're going to move on.

Our next slot was for Ms. Helene Dillard. Is she here with us today? I think I did see Helene. Yes, there she [00:00:30] is. The University of California, College of Agriculture and Environmental Sciences; welcome, Helene.

Helene Dillard:

Good morning. My name is Helene Dillard, and I'm the dean of the College of Agricultural and Environmental Sciences at UC Davis. I am honored to have this opportunity to comment on the top priorities in food and agricultural research, extension, and education, as well as the most promising [00:01:00] science opportunities for advancing food and agricultural sciences.

These topic areas align well with our college mission, which is to promote agricultural, environmental, and social sustainability through research, teaching, and public engagement to meet the challenges of global change in the 21st century.

Recently the USDA reported 12.7% of U.S. households were food insecure in 2015, [00:01:30] which is approximately 42.2 million people. The Food and Agriculture Organization of the United Nations estimates 795 million people, 11% of the population, were unable to meet their dietary energy requirements between 2014 and 2016. And globally, about 1 in 8 people do not have access to sufficient food.

FAO says we must increase food production [00:02:00] 60% by the year 2050 to meet the needs of the Earth's population, which is expected to grow from seven to nine billion people within the next 35 years. And we have to find a way to feed them using essentially the same amount of agricultural land that we use now. We face a rising demand for animal and other proteins, and an increased need for vegetables, fruits, and nuts, which are the basis for a healthy diet.

At the [00:02:30] same time, fresh water for use in agriculture is decreasing. Thus, there is an urgent need for increased national investment in food, in agricultural research, extension and outreach, and education for the next generation of leaders.

So let me take a moment to focus on some of those pressing issues.

Developing sustainable approaches to food production, increasing nutrition, and providing secure sources of food are absolutely [00:03:00] critical. In the broadest sense, sustainable agriculture in food systems ensures secure, safe, and high-quality healthful food for the world's population, without creating negative social and environmental impacts. Unfortunately, about one third of all food produced worldwide is wasted through food production and consumption systems, pre- and post-harvest. That adds up to approximately one trillion U.S. dollars. [00:03:30] Translated to calories, this amounts to one in four calories considered never consumed.

To feed the world, we must make sure food is available, the supply is stable, and the 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 decrease food waste by creating a more efficient system for distribution.

Another [00:04:00] critical area of focus is community and economic development, especially as our human workforce shifts. There are a variety of ways that innovation and technology can help. Conventional breeding and biotechnology can enable major crop improvements that can result in additional careers and jobs in the supply chain. Precision agriculture tools, such as global positioning systems, wireless networks, drones and crop sensors, and data analytics result [00:04:30] in advanced workforce opportunities for our rural communities. Research sponsored through NIFA can play a significant role in this progress.

Soil health is another critical area. Soil is being lost at a rate that is 10 to 40 times faster than the rate of formation. Soil microbial activity, fertility, and high organic matter content are the essence of healthy farms. Healthy soil can provide a major ecosystem service [00:05:00] by sequestering carbon and act as a defense against our changing climate. There are more microbes in one teaspoon of healthy soil than there are humans on Earth. Under the right conditions, these microbes can flourish, strengthening the soil so that it can grow more food, hold more water, break down pollutants, prevents erosion, and sequester carbon. We need to research the diversity of soil [00:05:30] microbes, create systems where soil can naturally act to remove waste and pollutants, and provide incentives to growers to decrease greenhouse gas emissions by managing soil health.

As a land grant university, it is our mission to meet the needs of the public, teach students in a manner that fosters partnerships and collaboration, advance knowledge through creative research and scholarship, and apply that to address the needs of society. [00:06:00] Educating future leaders is the cornerstone of that mission and must be a critical focus area. To address the needs of people impacted by food insecurity, our educators must be familiar with the population's most affected. Diversifying our students who are interested in the field of agriculture will better connect us with people in most need of support. This also includes fostering gender equality in agriculture.

[00:06:30] Women grow more than half of the world's food. They comprise 43% of the agricultural labor force globally, and that's up to 70% in some countries. Yet, they are unable to access the same resources as men, because governments and agencies aren't always aware of the obstacles and challenges women in agriculture face. To feed the world, we really need to invest in the women who are tending the fields. Empowering these women with [00:07:00] education and resources to succeed raises the opportunities and economic success of their families and communities, which results in an increase in productivity and growth for the greater society.

In closing, funding from NIFA in critical areas of need can have a tremendous impact. For example, with funding from NIFA, scientists in several states are focusing on saving the United States citrus industry. A disease called citrus [00:07:30] greening, also known as huanglongbing, has ravaged citrus groves throughout Florida. This year, this devastating disease was detected in

California. Our University of California scientists are conducting critical research to better understand how Asian citrus psyllids transmit disease to citrus trees, and they are developing practices that either kill Asian citrus psyllids or prevent the tiny insects from spreading the disease to more citrus trees.

[00:08:00] NIFA-funded work was also critical in generating integrated research and extension information to help our livestock ranchers during our recent historic drought in California. Range land support the livelihoods of millions of people around the world, while supplying critical ecosystem services. Drought is a significant natural hazard for an industry that is reliant on climate-sensitive resources and NIFA support [00:08:30] has helped us develop strategies to better manage our range lands during drought.

As scientists, policy-makers, and leaders, we have an obligation and a responsibility to seek solutions, but we need stable, significant, competitive, and capacity funding to reach our goals. Our world food and nutrition challenges are multidimensional and of critical importance.

I hope I have communicated the urgency of these topics. [00:09:00] It is imperative that we address the local and global problems of food now, as the effects of climate change are already altering our agro-ecosystems and challenging our collective ability to feed ourselves. Thank you.

Luis Tupas: Thank [00:09:30] you, Luis Tupas, Deputy Director for Bioenergy, Climate, and Environment. At your school, what are the fastest growing areas of research, as well as in terms of your student enrollment for programs?

Helene Dillard: Of the fastest growing areas of research in our College of Agricultural and Environmental Sciences, I would say first off, it's in sustainable food production. That would be both farming and ranching. And that is a significant [00:10:00] growth area for us. We have scientists, for example, that are looking at greenhouse gas emissions from livestock. We have these big bubbles that they're in so that we can monitor all the gases that are emitted. We're looking at lots of different cropping systems, and we also have an initiative that started in our college, but it's blossoming to several other colleges, and that is called the Smart Farm, looking at precision agriculture, sustainable [00:10:30] agriculture, and being efficient in our agricultural production.

In terms of students, we have grown from about 4000 undergraduates about in the year 2000, to 7343 this year, so we're growing. We're a college that's absolutely growing. We get over 10,000 applications a year for admission, and we only have 2200 seats, and that includes transfer and freshmen. So there's tremendous [00:11:00] interest from our students in food, food production, food systems, agriculture, precision agriculture.

The other big area though, is environmental policy. We have a lot of students in those majors, a tremendous interest there. I would say that of the two, there

are two monstrous-sized majors in our college. One is animal science and the other is agricultural economics, and both of those have over a thousand students each in the major. [00:11:30] So on the aggie con side, there's tremendous interest in that food, but there's also a lot of interest in what they call resource economics, which is around gas, oil production and things like that. So tremendous interest in our college and a lot of interdisciplinary work occurring with the College of Engineering, the Veterinary school that Michael Lairmore was from, and also with our College of Biological Sciences.

[00:12:00] Okay, thank you.

Speaker 1: Okay, moving on. So is Jane Sooby in the audience? Ah, there you are Jane. Okay, so Jane Sooby is coming to us from the California Certified Organic Farmers. Welcome, Jane.

Jane Sooby: [00:12:30] Thank you very much. Good morning, everybody and good afternoon to those of you online and thank you so much, NIFA administrators and staff for holding this listening session in California. Sometimes we feel like we're pretty far away from DC where all the action is happening, but we are a very significant agricultural state and we welcome this opportunity to direct address you and share with you our priorities.

[00:13:00] Let's see. Here we go. Wanted to start off by thanking NIFA for two really important programs, OREI, the Organic Agriculture Research and Extension Initiative and also ORG, or the Organic Transitions Program. I really need to update this slide; it's based on a report that was issued just last year, but it only looks at funding through the year 2014, [00:13:30] but those two programs invested a total of \$142 million into 189 organic research projects between 2002 and 2014, which averages \$11 million a year for organic research.

The good news is that the 2014 Farm Bill increased those funding levels to about ... And subsequent appropriations have released approximately \$18 million a year for [00:14:00] OREI, and another \$4 million for ORG. So we're looking at about \$22 million funding specifically dedicated to organic research annually right now. But these funding levels are still subject to political pressures of the appropriations process every year and in the Farm Bill discussions all the time. Always having to defend these funding levels every five [00:14:30] years when the Farm Bill comes up, and then in the appropriations process.

And so what we'd like to see is more integration of organic research priorities into other parts of NIFA programs so that we're not so subject to those political vicissitudes. But I also want to let you know that as a non-profit, we're fortunate enough to be able to engage on all fronts on these issues. We've participated [00:15:00] in the U.S. House Ag Committee's listening sessions, where they were holding all around the country. He had two here in California and we definitely advocate, to Congress itself, that they release more funds for organic research. And in fact, there is currently a marker bill that we hope will be incorporated into the Farm Bill that would increase the funding levels for organic research to

\$50 million a year, [00:15:30] which would keep this funding continuous over the Farm Bill's.

We have some funds, but this is a really thriving and important sector of agriculture and we think that it warrants additional funding. I'm still learning the structure of and all about the different programs; there's so many of them. But I took a look and [00:16:00] it seems to me that all of the AFRI foundational programs, all of the challenge areas, the Specialty Crop Research Initiative, the Youth Ag Education programs, and probably many more AFRI programs could easily and productively incorporate organic priorities.

So I just wanted to talk a little bit more about what is organic and [00:16:30] why are we talking about organic. We hear a lot from the university and agencies about sustainable agriculture, which actually does have somewhat of an official definition, but certified organic production is regulated under federal law. There is certain set of standards that are in the law and organic farmers are required to implement specific cultural practices, [00:17:00] including crop rotation. They are under legal mandate to not apply any materials that would contaminate the water or the soil, et cetera, et cetera. And they're not allowed to use synthetic inputs.

And one of the major differences that we've seen in organic soils is that soils perform very differently when they're managed with the biological inputs, instead of from synthetic ... [00:17:30] Of being managed with synthetic fertilizers.

We're regulated under federal law, have certain practices that farmers, ranchers, and food processors much follow. And this is, at the moment, almost a \$50 billion a year industry in the United States and that \$50 billion a year in retail-level sales is basically premised on \$7.5 billion of [00:18:00] certified organic farm gate production. Overall in the United States, 5.3% of the U.S. food sales are organic and 82% of U.S. households purchased organic products.

All together, the federal database, managed by the National Organic Program, shows that there are 25,000 organic operations in the United States, 14, [00:18:30] 200 of them are farms. All of these operations could benefit from NIFA funded research, as well as the consumers who purchase organic products.

To NIFA's second question, studying these topics, these promising aspects of organic farming practices, we believe we'll advance food and agricultural science for everybody, not [00:19:00] just for organic farmers. But a lot of these questions are really important for conventional producers as well. You've probably heard of the Rodale Institute; they've done a lot of work over the years showing that organic practices sequester carbon and they've really promoted organic farming as a ways to mitigate climate change. We've found a lot of studies show that organically-managed soils have greater water holding [00:19:30] capacity, and this may translate to higher yields under drought conditions.

A lot of research also indicates that well-integrated biological systems make, produce crops that have better resistances to diseases and pests. So these are some of the promising aspects of organic systems that we would love to see studied a little more so that we understand what's behind these [00:20:00] processes, and the mechanisms behind this and just make this information more available to farmers so that they can be more intentional in producing these environmental benefits through their farming practices.

We also have collected some research priorities from a few different sectors of the organic community. First of all, our colleagues with the Organic [00:20:30] Farming Research Foundation have been promoting organic research priorities for many, many years and most recently, they've published a national organic research agenda that sets forth these main priorities for organic farmers: building and measuring soil health, crop fertility and nutrient management. That may sound like a no-brainer to people who just want to apply nitrogen, but when you're using [00:21:00] biological-based inputs, compost, and you're relying on the breakdown, the mineralization by microbes in the soil, matching up the availability of those nutrients with the crop need is an ongoing challenge for organic farmers. Weed control is the biggest issue ever, always, for everybody. Survey after survey shows that to be true, [00:21:30] and clearly that's true for conventional growers as well so a lot of this comes back to the basic research that we always need to have done, but perhaps done in more of a systems context so that we have a better understanding of what the underlying dynamics are. Breeding crop varieties well-suited for organic production is also an important topic.

There are also processor and handler research priorities. [00:22:00] Just off the top, a few of them are developing alternatives to chlorine materials for processing, developing some biodegradable cleanser materials, using organic celery to cure meats, and also coming up with alternatives to BPA for lining cans.

We've also seen that there has been a lack of investment [00:22:30] in certain production areas; rice, cotton, and tree nut production, beef and pork production, economics, and labor needs of organic farmers.

There are some other synergies in the organic production that we think will also be fruitful areas for research that could be integrated into other NIFA programs. The health implications of measurably [00:23:00] lower pesticide residues on organic than on conventional foods. Which farming practice support biodiversity? And there's an ongoing debate around nutrient content in organic foods, whether or not organic foods actually have higher nutrient content, the underlying question is which production practices enhance nutrient content and crops?

We've also [00:23:30] seen some economic research that indicates that centers of organic activity have lower poverty and higher income rates in those counties. What are the mechanism behind that, and how can they be leveraged

overall? And kind of a stretch topic for everybody to think about, beyond fossil fuels, how are we going to retool our American agriculture in an era where we have increasingly less availability of fossil fuels and we're going [00:24:00] to be needing to base our food production on renewable energy sources?

I'm with the California Certified Organic Farmers. Our mission is to advance organic agriculture for a healthy world. We do this through certification. We are a certification agency. We also do education, advocacy, and promotion. Thank you very much for your time, and I welcome any questions.

[00:24:30] Great, thanks.

Speaker 1: Okay, great. Next up we have Amanda Crump, from the Western Integrated Pest Management Center. Welcome, Amanda.

Amanda Crump: [00:25:00] Hi, and thank you for this opportunity to provide a comment today. I'm Amanda Crump; I'm the director of the Western Integrated Pest Management Center. The Western Integrated Pest Management Center is a USDA, NIFA-funded program that is responsible for coordinating regional integrated pest management efforts. We link NIFA with the western states, [00:25:30] Pacific island territories, and the tribal nations located in the West and we connect those IPM programs and researchers with each other. Our goal is a healthier west with fewer pests.

My comment today is informed by my work in agriculture, by my research on education, and by the stakeholders who regularly communicate with the Western IPM Center. It's also driven by the unique challenges we face in the West. [00:26:00] You heard this this morning, but I'm going to say it again; the West is a really special place, but what makes it special also makes it a challenging place to manage pests. Nearly every day, the highest and lowest temperatures in the 48 contiguous United States are found somewhere in the West. Our climates range from tropics to tundra. The West is home to the 7 of the 10 most urban states, but also home to a large rural population. [00:26:30] Most of the nation's public lands are in the West, and Western crops are produced adjacent to those natural areas. Our cropping systems are also incredibly diverse with over 400 crops being grown throughout the region. And if our region wasn't complicated enough, all of our struggles are exasperated by the retirement of researchers and extension educators in all of our fields of study.

So with [00:27:00] these challenges in mind, I think that supporting smart, safe, and sustainable pest management should be a top priority for NIFA, and here's the reasons why; everyone has to manage pests. Whether those pests are found in their homes, recreational areas, or farms. Unfortunately, many of the ways pests are currently managed are not sustainable or safe. However, NIFA has supported research extension and education on pest management through programs like [00:27:30] the Agriculture and Food Research Initiative and the Crop Protection and Pest Management program. These programs fund pest

detection and diagnostic efforts. They fund improvements in regulatory systems and they fund the development of new pest management strategies. These small investments by NIFA have so far protected our multi-billion dollar agricultural industry

But given how complex our pest challenges are becoming in light of the rapid [00:28:00] establishment of new invasive species, the impact of shifting climate and weather events on endemic pests, and the limited labor and expertise to develop new pest management tools, just to name a few of our challenges, we really need to keep up and expand this work. So supporting smart, safe, and sustainable pest management is good for our environment, our health, our pocketbooks, and our food security.

As the Western IPM Center [00:28:30] director, I see three big opportunities to advance food and agricultural sciences through investments in pest management. I have degrees in both social and biophysical sciences, and manage a very diverse team, some of whom you'll meet later, so I think I have a unique perspective.

First, and this was mentioned before, I see great value in creating a space for interdisciplinary teamwork. Look at integrated pest management; it's an integrated [00:29:00] discipline where there's room for entomologists, plant pathologist, weed scientists, and vertebrate pest managers, but we're also home to ecologists and environmental scientists and economists. But I would argue that we need to start engaging other disciplines, too.

For example, we struggle with labor availability in the West and the labor shortage could be address through either a technological or a political solution, but those solutions [00:29:30] rely on engaging engineers, political scientists, or others, in additional to traditional agricultural scientists.

Second, I believe that we have a great opportunity right now to evaluate our previous work and use that evaluation to move agriculture forward. 10 years ago, the U.S. Agency for International Development reviewed old projects it had funded because they knew that research often takes more time to mature than in any given grant cycle. [00:30:00] USAID rediscovered a small grain storage technology developed at Purdue University that had been sitting on the shelf for nearly two decades. The agency dusted it off and reintroduced the technology and now it's used in tropical climates throughout the world to keep seeds pest-free.

By evaluating our work in a rigorous way, we may find forgotten gems and hidden accomplishments that improve lives and inspire [00:30:30] current and future researchers and extension educators.

Third, we have to invest in training a new generation of professionals. Not only do we need to train people to do our work, but we need also to be training

people in other disciplines to engage with us. The challenges we face are going to be addressed by young and creative people who are committed to environmental and economic justice. We need to mentor and engage them, and we need to structure [00:31:00] our communication efforts to develop partnerships with them.

In conclusion, I see many opportunities to advance pest management through long-term investments and interdisciplinary teams, evaluating past accomplishments, and developing creative capacity in the next generation of professionals. And I think these three things would fit well with NIFA's work and advance its mission. Thank you.

[00:31:30] Luis has a question.

Luis Tupas: So Amanda, what do you see as the future of the best management centers?

Amanda Crump: Of the regional pest management centers? I see the future is bright. We are always looking for additional resources to fund [00:32:00] the creative things we have to do, but I like to be optimistic about the work we've done. So if you look at the four regional IPM centers, we're doing a really good job of trying to evaluate the things we've been doing and our contributions to each of our regions, but if you just take the Western IPM Center, I feel as though we've been able to show that by engaging people across [00:32:30] each border, by engaging people in different kinds of sectors, for instance in natural resources and urban sectors, that we've been able to advance integrated pest management.

Yeah, so I think this kind of collaborative thing is definitely something that is sustainable.

Speaker 6: Amanda, one of the things that [00:33:00] I've seen in California is a lot of what I would call invasive pests that are coming in on shipments through the sea and airplanes, whatever. Do you see a role for the Western Center in trying to curtail some of the introduced pests that we're dealing with now?

Amanda Crump: Thanks for your question. Yeah, so invasive pests, invasive and resurging endemic pests are definitely a problem [00:33:30] all throughout the West and we see new invasive pests come every day into California and then also into some of the Pacific island territories and other parts of the Western United States.

Currently, the Western IPM Center has a small effort behind trying to support the work on invasive species, but because of the level of funding that we have what we have chosen to do is to invest in invasive [00:34:00] species that attack minor crops or minor cropping systems, or situations. So for instance, we don't have nearly the amount of money that it would take to combat Asian citrus psyllid, but we can make good investments to get people on their way to battle

pests like coconut rhinoceros beetle, for instance. And so I would love to see the Western IPM [00:34:30] Center play a greater role in coordinating efforts regionally in invasive species, and that would be something that I'd love to find more funding to do because I think that together with the other partners that we have throughout the West, all the states working together, that we could really do a lot of that good work.

Thanks.

Speaker 1: [00:35:00] Okay, we're moving right along. Okay, so are you ready for some more trivia? All right, just a couple more. Okay, so what year was the USDA founded? All right USDA folks, you can answer this one. 2009? Yeah, I won't say that Jeff Steiner said that. 1862!

All right, so here's a really easy one. [00:35:30] Who is the director of NIFA? Dr. Sonny Ramaswamy, that's right. All right, so we're about five minutes ahead of schedule, but I'll keep us going.

Okay, so we have Jim Farrar here today. He's with the University of California Integrated Pest Management Programs. Jim. Or, I thought he was. There he is, sorry.

Jim Farrar: [00:36:00] Good morning. Thank you for the opportunity to provide input to NIFA as you plan for the future. My name is Jim Farrar and I am the director of the University of California Statewide Integrated Pest Management Program. This program is housed in the University of California Ag and National Resources area, which was introduced this morning by Katie Panarella.

[00:36:30] The University of California Integrated Pest Management Program began in 1979 and currently consists of 11 IPM advisors located throughout the state of California and 20 staff in Davis, California working to translate university pest management science into usable, safe, and effective pest management tools.

The program also works collaboratively with cooperative [00:37:00] extension specialists and advisors throughout California and with university extension personnel throughout the Western states to stay abreast of current issues, avoid duplicative effort, and continue to improve pest management safety and effectiveness.

Integrated pest management is a science-based approach to managing pests while minimizing economic, human health, and environmental risks from pests [00:37:30] and pest management practices. Pests pose economic, human health, and environmental risks and pest management practices pose economic, human health, and environmental risks.

Minimizing these risks while managing pests is the goal of integrated pest management. And I'd like to say also that integrated pest management is system agnostic, in the sense that you can apply it to manage pests [00:38:00] in any system where you're managing pests, whether it's conventional agriculture, organic agriculture, your yard and garden, or inside the home for pests inside the home.

Integrated pest management plays a central role in agricultural sustainability. Prevention of food waste, food safety, and security, urban landscapes, and residential safety. Examples include interactions [00:38:30] between soil fertility, irrigation, and pest management in production agriculture, food wastes due to rot organisms, or making the produce less appealing, less aesthetically appealing. Pests impact the aesthetics of our urban landscapes and the safety of our urban landscapes and pests can also even attack us in our homes and apartments, in our beds, like bed bugs.

[00:39:00] The Western states produce hundreds of specialty crops, which Amanda mentioned earlier. These are the fruit, nut, and vegetables necessary for a healthy and varied diet. Some examples include pecans in New Mexico, hazelnuts in Oregon, leafy greens in California and Arizona, table grapes and raisins in California, and hops in Washington and Oregon. Each specialty crop has its [00:39:30] own pest and disease complex and each needs a specifically designed integrated pest management program.

The Western states also have important challenges with drought, fire, water resources, and increasing urban populations. More specifically, my state California, is home to 39 million people, produces half of the nation's fruits, nuts, and vegetables, and has some of the nation's [00:40:00] most spectacular natural areas. Each is under constant threat from new invasive species, like Asian citrus psyllid and the disease it transmits, Huanglongbing, in citrus. And resurgent endemic pests, like bed bugs and pine bark beetles.

These are not small problems. Huanglongbing is currently an existential threat to Florida's citrus and may become an existential threat [00:40:30] to California citrus. Bed bug infestations drive people to often ineffective and dangerous do-it-yourself remedies. Tens of millions of pine trees have been killed by drought and bark beetles in California natural areas with implications for fires, water sheds, and ecosystems. IPM programs need to continually adapt to challenges from these new and established [00:41:00] pests and shift in societal tolerance for pests and pest management practices as expressed through laws and regulations.

The rapidly changing pest spectrum impacts food safety and supply and can degrade our environment directly, through destruction of ecosystems or indirectly through pest management practices. Our ability to respond to invasive and resurgent endemic pests rests [00:41:30] on a network of agricultural research and extension scientists working with stakeholders and clientele. This networks includes cooperative extension, agricultural experiment stations, land

grant universities, state and federal agencies, and federally-funded organizations like the National Clean Plant Network, the National Plant Diagnostic Network, the regional IPM centers, which Amanda mentioned, [00:42:00] Sustainable Ag and Research Education program, IR4, and many others.

We need to strengthen these collaborative efforts amongst pest management experts in plant pathology, nematology, entomology, weed science, and vertebrate pests and to expand to collaborations with technology experts in robotics, sensors, artificial intelligence, supply chain logistics, and [00:42:30] energy to solve today's complex problems in integrated pest management, agriculture, food systems, and urban environments.

Much like the biomedical revolution, it is the integration of multiple disciplines into single projects that can lead to transformative innovation to improve pest management, agricultural productivity, food safety, and ecosystem services while also giving rise to new businesses. [00:43:00] Supporting and nurturing both existing and new types of collaborations would be vital to continuing to meet the challenges of invasive and resurgent pests and to realizing the potential of new technologies in pest management and agriculture.

Thank you for listening. [00:43:30] All right, all right. Thank you.

Speaker 1: Somebody realizes they lost their pen, it's up here. Okay, so next, we have Missy Gable? Not sure if I saw Missy. Ah, there she is. So Missy Gable from the University of California, Division of Agriculture and Natural Resources. Welcome, Missy.

Missy Gable: [00:44:00] Well to everyone with NIFA, those here and those who are not physically present in Sacramento today, I want to say thank you for this exciting and really tremendous opportunity for all of us to share our thoughts with you.

Oh, sorry. Let's go back here.

My name is Missy Gable. I am the statewide director of the Master Gardener [00:44:30] Program for the University of California, division of Agriculture and Natural Resources. I am here today to present on behalf of the National Initiative for Consumer Horticulture, or NICH.

NICH is a collaborative effort of academics and industry people from across the United States and working together, we aim to raise awareness and garner support for the field of consumer horticulture.

So what is consumer [00:45:00] horticulture? Consumer horticulture is gardening in it's most broad sense. It is the cultivation, use, and enjoyment of plants, gardens, and related horticultural items and services. Consumer horticulture spans a wide variety of landscapes and participants. It includes

anything from container gardens on a backyard patio [00:45:30] to large-scale botanical gardens that have massive footprints in our communities. It also spans irrigation technicians to landscape supply producers.

As I mentioned, consumer horticulture has participants from all walks of life. Again, the NICH effort is a combination of academic industry folks and we're looking to make impact [00:46:00] for those participants in consumer horticulture, including the public and the consumers. Consumer horticulture has seen a steady and reliable upward trend, specifically since around 2008. Millennials are leading this trend, we're very excited to say, and there are incredible opportunities now in the field of consumer horticulture with need for research and extension. Without research and products and service to inform products [00:46:30] and services in the field of consumer horticulture, and without the valuable extension work to educate the public and the consumers, we have situations where practitioners of consumer horticulture may be using excessive amounts of water, may be overapplying synthetic products to deal with pest issues, may be inadvertently introducing invasive species that we've already heard so much about today.

So I find that there are incredible, promising science opportunities in the field of [00:47:00] consumer horticulture. I'm going to share just a couple of them with you now. Here in California, an average of 50% of residential water use is in the landscape, and that is a range, actually, on coastal areas where we have a lot of ambient moisture in the air. Landscape water use is around 30%, but in our urban residential areas, we're seeing 60% of residential water use being applied in the landscape. It's a tremendous [00:47:30] amount of our valuable natural resource that is going to the beautification of our gardens, and our landscapes, and our communities. In times of drought, very strict water usage standards are placed on residents of California.

Now, consumer horticulture has the ability to save water, not only through research into new plants, but also into extension areas [00:48:00] where we can help the public in adjusting their water standards in removing unused or unnecessary turf grass and applying mulch to preserve water content in your soil, and in conducting effective irrigation audits in the home landscape.

Also, in California, but it's certainly not unique to California, we have an increasing population. As our population increases, these space that we have available in landfills [00:48:30] is decreasing, and we have a tremendous need for viable options to deal with waste management. It's estimated that 30% of items going to the landfill are organic and compostable. So I see promising opportunities, specifically in extension, related to diverting green waste from landfills. Also, anaerobic decomposition that takes place in landfills is producing methane gas, a common greenhouse [00:49:00] gas according to CalRecycle. We have an opportunity to come in and help the public to understand how to divert that green waste from their landscape. In a biocycle study, 16 households were able to divert almost six tons of green waste in a mere 10-month period.

We also have an opportunity in the area of consumer horticulture to inform and promote the use of integrated pest management practices. [00:49:30] Specifically related to home use of synthetic control methods for pests, we have unfortunately a pervasive issue with overapplication, or inappropriate application of pesticides by the home owner and we're looking to increase extension programming so that we can inform integrated pest management practices. We teach the public about preventative methods. We teach the public about least-toxic [00:50:00] control methods. We inform people on the use of pesticides and how to accurately read a pesticide label. We work to eliminate runoff issues from home landscapes where pesticides are over applied, and we work to eliminate exposure issues that homeowners deal with on a regular basis when they are trying to manage pests in their landscape. We're working in these areas now, but there's a tremendous amount of effort that can still be applied, and a significant amount of work to do.

As [00:50:30] we've already talked about today, California and many states deal with exotic invasive species. On average, California gains new and potentially damaging invasive species every 60 days. These invasive species threaten agricultural, urban, and natural landscapes. It results in incredible direct economic losses to the state of California; specifically in California, approximately \$3 billion, but also massive indirect losses, which costs cannot [00:51:00] be calculated. We've heard a little bit about Asian citrus psyllid and the disease it vectors, Huanglongbing. Unfortunately, we believe that that was unintentionally introduced to the state of California through smuggled bug wood, from a homeowner who was looking to augment, make improvements on their citrus tree.

Extension programming can be a huge part of educating the public about how to be a first responder, how to avoid bringing exotic invasives unintentionally [00:51:30] into our state and other states, how to identify those issues, and how to be a part of the solution, working with state and national efforts to eliminate and eradicate those pests.

As you can see, there is tremendous opportunity in the field of consumer horticulture. I look forward to the day when we have more testing for water needs of plants, so that we can inform the industry, support the industry, and ultimately support our consumers [00:52:00] in making more informed, better decisions about the plants that they're putting into their landscapes. There are opportunities for selective breeding for desirable traits of plants. Certainly, when we're looking at reducing green waste, selective breeding for size of plants is critical. When looking at adjusting our landscape water use to reduce the amount of water we're applying, identifying plants that thrive in low-water environments. Also, understanding the tolerance of existing plants [00:52:30] is critical and we don't have enough research in that area right now. Identifying sustainable practices, educating practitioners, helping people understand that they can and should choose the right plant and put in the right place.

Now, I am going to end on the fact that consumer horticulture has many areas of impact. I have only shared with you a couple that are near and dear to my heart. My colleague from Oregon State University, Gail Langellotto, will be speaking to you in a little bit. She is also [00:53:00] a part of this NICH effort. Again, a collaborative effort to bring awareness to consumer horticulture. And I appreciate the opportunity to share with you the value that consumer horticulture has in our current industry and what we can do to invest in it and support it into the future. Thank you.

Any questions? Excellent. Well, we have a couple of handouts outside at the check-in table as well, if you're interested. [00:53:30] Thank you.

Speaker 1: Okay, so next up we have Matthew Bayer? Bauer? Bauer? Baur. Okay, so Matthew comes to us from the Western Integrated Pest Management Center, as well. Welcome, Matthew.

Matthew Baur : Good morning and thank you Director Ramaswamy and Deputy Director [00:54:00] Qureshi for the opportunity to provide input into the next USDA NIFA, strategic plan.

Funding pest management projects in early stages of development with small grants, usually grants that are less than \$50,000 in value, and funding the pest management practitioner networks are critical to delivering pest management products that protect the agriculture enterprise. USDA [00:54:30] NIFA currently supports these efforts and with the Western IPM Center, believe that support for these efforts should continue.

In my written statement, I discuss the importance of funding projects and programs in the early stages of development. I suggested that funding at this stage helped to bring transformative research to practitioners that could use these tools. I also discuss the importance of networks of pest management researchers and extension agents that function to disseminate [00:55:00] the research results and increase the likelihood of implementation. Here, I will provide specific examples of how this funding has helped specific projects and what success these projects have achieved.

In 2015, Jeremiah Dunne received a \$30,000 grant to develop a diagnostic test for ergot spores, effecting grass seed production in Oregon and Washington, and to start an alert system that would result in optimal [00:55:30] timing of fungicide applications for ergot control and grass seed production. The project resulted in an effective test and a grower alert system, which is in the form of a newsletter, that helps time fungicide applications and prevent unnecessary fungicide use. The alert system continues today with support from Oregon State University, USDA-ARS, and Oregon and Washington seed grower commissions.

[00:56:00] Powdery mildew is a relatively recent problem for hop production in the Pacific Northwest. Ann George of the U.S. Hop Commission has worked on

this issue since about 2013. Their group has identified several virulent strains of the pathogen powdery mildew and identified hop varieties that are especially sensitive to this problem. Recently, work by David Gent at Oregon demonstrated how [00:56:30] early detection of the infection on farms in an area-wide effort can effectively limit the disease and the need for treatment.

The network of extension agents and pest management practitioners will be essential going forward in the effort to achieve area-wide producer cooperation in the early detection of disease foci.

Soil solarization has benefited from technological advancements, including anti-condensation plastic films, but nurseries [00:57:00] do not have information on how long the film should be left on under different climate conditions in the Pacific Northwest. So Jennifer Parke is working on optimizing soil solarization for nurseries in the Pacific Northwest and is currently working on mathematical models with the help of Len Coop at USPEST.org on developing and validating models for growers to use.

In 2010, Marion Murray at Utah State University [00:57:30] began surveying tree fruit growers in Utah with a project worth about seven thousand dollars. This work continues today, and the survey provides important information for Utah State University IPM, integrated pest management newsletter, which provides important information for pest management practitioners in Utah. This integrated pest management newsletter is broadly hailed as one of the best pest management newsletters in the West. The project has attracted additional [00:58:00] funding, including specialty crop block grants.

Here, I've tried to demonstrate with these specific examples how small grants provided through the USDA NIFA and funding of the network of researchers, extension agents, and practitioners helps to deliver important tools to producers that transform how agriculture is practiced today.

Thank you again for this opportunity.

Speaker 1: [00:58:30] All right. So next up, we have Steve Elliott. Steve, are you out there, Steve? He's also from the Western Integrated Pest Management Center. Welcome, Steve.

Steve Elliott: I am from the Western IPM Center. [00:59:00] You've heard enough about integrated pest management. I will talk about something different.

I've been the communication coordinator at the center for about four years and have been a public communicator for more than 30, so I was very, very pleased to see communication is one of the four pillars of NIFA's 2014-2018 strategic plan because that properly recognizes the important role communication does play, can play. And taking science from laboratories and experimental fields into

the real [00:59:30] world where it can improve people's nutrition and food security, quality of life, and economic opportunity.

What the old strategic plan didn't do however, and what a new strategic plan and I urge, should, do, is recognize that communication should not be an after the fact activity that tells people what NIFA and NIFA funding did. Also, the performance measures in the old plan focused pretty strongly on YouTube and Twitter engagement [01:00:00] and that's a very, very narrow ... They're measurable, but they're not necessarily the most meaningful measures. Instead, I recommend NIFA focus on ways to integrate communication into its science mission so the communication is a part of the agency's research extension and education activities, not an afterthought. By incorporating communication into research extension and education, communicators can help scientists create the benefits that they're trying to create and [01:00:30] the advancement that NIFA desires and envisions, not just promote them after they've been done.

There's a substantial body of research that shows awareness of an issue, even an agreement with it, does not necessarily lead to behavior change. And NIFA's funded a great deal of excellent science that requires behavior change, requires adoption to realize real world benefits in areas like reduced tillage, nitrogen and nutrient management, cover cropping, integrated [01:01:00] pest management; behavior change is necessary to realize the promise of the science.

Communication properly prioritized and executed can help that. There are a number of specific steps NIFA can take to move in this direction; I'll mention four. Involve communicators within the agency during program and RFA development. Prioritize integrated communication activities in those RFAs and programs. Engage behavioral psychologists ... Psychologists. [01:01:30] Risk management experts, economists, and other social scientists to develop communication plans that go beyond awareness and get to behavior change. And then fund research itself into communication that can help NIFA's overall mission; how can communication help us fund that kind of research?

A few quick examples of how it's being done. Multiple efforts focused on stopping the spread of invasive species have made it very, very easy for people to know what they're all about. Don't move firewood, [01:02:00] for instance, is the name of the organization, it's the web address, and it's the message all in one. Clean, drain, and dry is a checklist for boaters to keep aquatic pests from spreading and play, clean, go, also the name of the organization, tells outdoor recreationists exactly what they can do to keep from spreading invasive weeds and other pests with their bikes, boots, and other outdoor gear.

We're looking at a similar idea at the Western Integrated Pest Management Center. Amanda previewed it. [01:02:30] Instead of talking about integrated pest management as a thing, as a set of practices that people do or don't do, we're looking to engage people around the concept of smart, safe, and sustainable pest management. We're looking to engage them to explore this idea of advancing this as an easy to grasp framework for how to management

pests, almost a philosophy, rather than specific tools or techniques. And rather than the name integrated pest management, which you then have to explain to a lot of people anyway. [01:03:00] We want to connect with people through the idea that successful pest management is smart, safe, and sustainable, and then engage them exactly around what those concepts look like in whatever system they're managing pests in, from conventional and organic agriculture, to forest and range lands, to schools or communities.

At the National IPM Coordinating Committee meeting in Washington two weeks ago, Sonny Ramaswamy spoke about the need for more communication about food and agriculture and in an afternoon workshop that [01:03:30] same day, that committee endorsed the idea of creating a new position, a national IPM communicator, to connect the dots, and the research, and the stories that the states and the regional IPM centers are already producing and to tell national stories that raise the profile of integrated pest management. Smart, safe, and sustainable pest management to increase awareness and adoption. It's this idea of using communication to advance NIFA's scientific mission and to create positive outcomes that I'm recommending here [01:04:00] today, because it's something NIFA can do that will help it accomplish everything else it wants to do.

Thank you.

Speaker 11: I'm just curious if the group that you just referenced has given any thought to how to refer to IPM with the general public? Like you mentioned, we all understand what IPM is in this room, [01:04:30] but it doesn't necessarily translate to a general audience.

Steve Elliott: And it's difficult, because it is such ... It varies in its practices, from agriculture to homes, to everything else, then you've got to explain the name, and this is what it means, and everything else. So in this room, we can talk about IPM and integrated pest management. To the general public, let's talk about smart, safe, and sustainable pest management, and this is what that means in your garden. This is where to get smart information. This is where how to think about safety and how to think [01:05:00] about sustainability. And you can do that in a school setting because that'll be quite different than an agricultural setting. You can do that with production agriculture.

So we're looking at talking about a concept rather than a thing. We're in the process, Amanda and I are working on a paper about it, but hopefully it starts a different conversation.

Speaker 12: [inaudible 01:05:31]

[01:05:30] Most of NIFA's integrated projects or programs or RFAs require at least two out of three functions: research, education, and extension, and our assumption is that we are hopefully asking for proposal which [01:06:00] do

include communication plans, do include translation of research findings to the consumers, which do include outreach component as explicit component. Is that ... Is your proposal of integrating communication into RFAs more explicitly because currently it is little, not very explicit? Is that [01:06:30] the message I'm hearing from you?\

Steve Elliott: To a degree, yes, but I can't speak to all your RFAs because I haven't read them all, but I've ready many of them in our crop protection pest management area. And specifically, the RFA that funds the regional centers, it's gone through some changes. We used to have five objectives and now we have seven objectives, none of which communicate the benefits of IPM to public, to a regional audience. You can infer a communication component in [01:07:00] several of them, create information that works, but none of them actually say communicate. Talk about the science broadly.

And as a result, two of the four centers have full-time communicators, and two don't because we've interpreted it differently and it's not specific and explicit.

Speaker 12: Thank you.

Steve Elliott: Any other questions? [01:07:30] Thank you.

Speaker 1: All right, so one talk between you and lunch. Do we have a Ruth Dahlquist-Willard? Okay, Ruth is here from the University of California, Cooperative Extension. Welcome, Ruth.

Ruth D-W.: [01:08:00] Well, thank you for inviting us all to be here today and to share thoughts about needs and opportunities for research. I'm Ruth Dahlquist-Willard, I'm from the University of California Cooperative Extension in Fresno County, on the Small Farms and Specialty Advisor. And I want to talk today specifically about specialty crops and particularly new and emerging specialty crops.

So California has a huge specialty crop industry, but there's even more crops that [01:08:30] we can grow in California that maybe we're not growing now on a large scale. One thing I want to point out about new and emerging crops is that the research on those crops begins on a small scale. So it might begin on smaller farms or in research trials. Usually doesn't receive funding from commodity groups, since there's not a commodity group yet for those crops, and so the small start of those crops is like an incubator [01:09:00] that could grow into a larger industry.

One example of that from the Small Farm Program is Manuel Jimenez and also Richard Molinar, pretty much starting off blueberry production in California. So in 1997, there were only 196 acres of blueberries and then now, it's a large industry. There's the California Blueberry Commission, there's mergers between California companies and Chilean companies, so it really took off, but it stated

pretty small. [01:09:30] And so that's one thing I want to point out, in terms of funding, is looking at RFPs and when it's desirable to hand input from stakeholders and support from stakeholder groups. That might not be the case for a crop that's just starting out.

Another example is dragon fruit or pitaya. This is Ramiro Lobo, he's the Small Farms advisor in San Diego county and he's been working for years on dragon fruit. Dragon fruit is another [01:10:00] thing that's kind of taken off. This is from Jamba Juice, "the magic dragon fruit". And they've had this huge promotional campaign; if you go onto Jamba Juice ... At one point, there were all these posters on dragon fruit and its wonderful benefits, this bright pink thing. And people weren't familiar with, but through this marketing campaign, they're now more familiar with it.

When we look at emergency ... Emergency. Emerging crops for California, specifically looking at crops that can address our environmental and [01:10:30] economic challenges here. We've heard a lot of mention of the drought today, so reducing water use, crops that have water use requirements. Also, when existing industries are threatened by invasive pests or diseases or other challenges, looking for alternative crops. And then we have this huge market potential I think in the West, and also in the nation, for niche and local markets, things like Farm to Fork, local craft beer, that sort of stuff. And also higher [01:11:00] quality produce compared to imported produce. We're filling in gaps in availability when produce coming in from other areas is not available locally. And I also think just the more diversification we have in the agricultural sector, the more resilient it is to change; economic change, environmental change, whatever the case may be.

So I want to highlight a few crops that people are working on now in either the Small Farm program or the UC [01:11:30] system that kind of fit these criteria of emerging crops that might be able to help us meet some of these challenges.

One of those is jujube. Jujube is a crop that's grown on a small scale in the Central Valley now, and also in Southern California. It's drought tolerant, it's got a very low water-use requirement, also has currently very low pest pressure, and it has the huge potential as a fruit that could be available for processing. [01:12:00] There's a need for research for processing jujube, post-harvest, as well as selecting varieties or cultivars, breeding. There's a lot of newer varieties that are being developed in Korea that haven't been trialed in the United States, including some that are going towards not have a pit, which would make processing a lot easier. And I think jujube has a huge potential as a fruit that's not necessarily for fresh market but that could be included [01:12:30] in things like granola, trail mix, baked goods. When it is eaten fresh, it's not that exciting; it kind of tastes like a dried apple. But when it's cooked, it released this flavor complex that's sort of like a date, or a dried apple, or a fig flavor combined and that's another example of an emerging crop that could be grown on a larger scale if the research was done.

Here's another example from the Small Farm program. [01:13:00] If you look at this picture of a coffee farm, that to me looks a lot of like Central America; the fog in the background with the hills, the guy picking coffee. That's actually not in Central America, it's in Southern California, in Santa Barbara area. This is Good Land Organics in Goleta, who's been working with Mark Gaskell to grow coffee combined with avocados. So this is a coffee and avocado farm and this is an example of [01:13:30] a crop that ... It's not ... You don't think of coffee as being grown in California, but there is a niche market for local coffee production and roasting that can add a lot of value to a small- to mid-scale farm operation. So this a quote from the owner about how he's improved his economic situation through adding coffee to avocado production and the willingness of people to pay for a local product. And there's Mark working with the coffee plants.

[01:14:00] Also tea is another crop that we don't think of as being grown in the United States, but it grows in California. There's actually been in the 1960's and 70's, there were trials of tea plants at the Kearney Agricultural Research and Extension Center in Parlier, California, so that's Jackie Gervay-Hague at UC Davis Chemistry Department and then Jeff Dahlberg, the Director of KARE with one of the original [01:14:30] tea plants that was planted down there. And then over here, it's a farm in Northern California of someone who's growing their own tea; it's Golden Feather Tea Farms. That's something that ... It's not going to compete with obviously overseas imports of tea, but there are local markets that could potentially be accessed for local, U.S.-grown, or California-grown tea. And there's also potential for water savings because deficit irrigation [01:15:00] of tea could be done for particularly flavor compounds or quality that could also result in water savings.

And then this is a crop that I'm working on now, moringa. Anybody heard of moringa? So it's usually known as a crop that's promoted overseas for agricultural development work, but it's actually grown in California also. So in the Central Valley, there's Hmong and Filipino growers that are cultivating it for smaller scale markets, [01:15:30] some farmer's markets, some selling to wholesalers so it's also a crop that's pretty drought-tolerate, very low water-use requirement, and it's becoming more known as an emerging superfood. So it has very high mineral, vitamin, and protein content as well as anti-inflammatory, anti-diabetic, antioxidant compounds. So it's becoming more common to see moringa products on the market. You can see them at Whole Foods, you can order them online. But almost all that moringa is sourced from outside the United States, so there's [01:16:00] a potential for moringa being grown within the United States as a more local source for some of these kinds of products, and also for fresh market.

One more I want to mention is avocados. Mary Lu Arpaia is trying to develop avocado varieties that are appropriate for the Central Valley. And so we mentioned drought as one of the things to look for new crops to adapt to that situation. [01:16:30] Another one is pest pressure, so I know many people have already mentioned huanglongbing, or citrus greening, and the Asian citrus psyllid and obviously, there are many wonderful efforts underway to control the

spread of that pest and that disease. There's also the potential that worse-case scenario, if it does spread in California, there will be a lot of citrus growers that might be looking for a new crop, and so her research is on avocado varieties that could potentially be grown instead of citrus in the Central Valley.

[01:17:00] Just to wrap up, some of the needs and opportunities regarding these new and emerging crops. I mentioned earlier, it's more difficult to find funding for research on newer crops that aren't supported by stakeholders and commodity boards as much, so that's something that I might just mention in terms of how proposals are evaluated or how broadly an RFA includes different kinds of crops. [01:17:30] But there are things that start small and then become larger if they're successful, so I think it's a really exciting new opportunity, especially for things like adaptation to climate change and drought in the West, alternatives to crops that might be threatened by invasive pests, and then the potential to access new markets with new crops that haven't been grown here before. And then just the importance of diversification [01:18:00] and the small start that can eventually create new industries.

So that's it. Thank you again for allowing us to speak today, and I'll take any questions you have.

Speaker 14: It was a comment really, that most of these emerging crops that you noted [01:18:30] are perennials and is it generally the case that California with water issues, that may be an important exemplar, if you'd like, moving forward, that we'd favor perennials?

Ruth D-W.: I don't think it's necessarily limited to perennials. Moringa is actually ... Can be grown as a perennial or an annual because it doesn't survive the winter very well, so it kind of depends how you're growing it. Yeah, that's [01:19:00] a good question. I think it's true that those are all perennials; I don't think it necessarily excludes annuals, though.

Luis Tupas: Hi, Luis Tupas. The idea to try a new plant or even a new variety, what's the origin of that idea? Does it come from cooperative extension to try it? Does it come from a farmer who says, "Hm, I like dragon fruit. I want to try this"? [01:19:30] Does it come from the ag experiment station who's trying something new and they thought [inaudible 01:19:35] we found something new or a combination of those things? Where does the creative process start, because I think, talking about means and opportunities, that's one of the things that will factor in that kind of development. Can you kind of take us through any one of those?

Ruth D-W.: Well, it depends on the crops. There's both examples of both of those things. So with moringa, when I came into [01:20:00] my job, people were already growing it on a small scale and I was so fascinated to discover it there because I thought of it as a tropical plant. Jujube's already being grown; that was started by farmers. Tea I think is more of the thing that was introduced by the experiment station. And I think coffee as well was I think cooperative extension was more

the impetus for that than the growers, so I think it depends. There's both [01:20:30] scenarios. Sometimes [inaudible 01:20:32] growers have already started doing that, and then the extension agent or researcher might realize this is something that could be expanded. And then sometimes it's completely from the research side that's, "Let's try this and see if it works."

Okay, thanks.

Speaker 1: Okay, let's give one more round to all the speakers [01:21:00] this morning. Fantastic. So we're going to break for lunch, and so what that means for the folks online, we'll be back at 1:00 out here in California, but that means, let's see, 3:00, is that right? 3:00 in central time and ... Am I right? Everybody's looking at me ... Okay, I'm right, all right. 3:00 central time and 4:00 eastern time, so we'll see you back then. Thanks.

Jeannette: Okay, so welcome back. I hope you all had a good lunch. Welcome back to NIFA Listens: Investing in Science and Transforming Lives. This is our third stakeholder listening session. We're halfway through the day. I would like to invite Mr. Rob Bennaton from the University of California Cooperative Extension to provide his comments. Welcome, Rob.

Rob Bennaton: Good afternoon, everybody. How's everybody doing today? [00:00:30] Good, good. The clicker ... where's the ... Ah. Okay. For about 100 years now, UC Cooperative Extension has been supporting applied research and education programs throughout the state of California. Globally, we're at a point where greater than 50% of the world's population lives in cities, with a projected 50 to 60% increase in the population by 2050. Significant urban poverty [00:01:00] and food insecurity has been found as well, both globally and in low-income areas of the state.

California is currently the powerhouse leading the nation in agricultural production, both on the livestock and crop production side. However, about a million folks in the state of California are currently living in food deserts with no supermarket or grocery store or healthy food options within a mile's radius. Low retail food access often corresponds [00:01:30] with low income in underserved communities. This exists in about 371 California census tracts, with about 85% of them being in urban spaces. As we densify in cities across the globe, we're also experiencing the urban heat island effect, which is significantly impacting environmental quality in terms of soil, air, and water quality. It may be best to think of them as sponges on their own, conceptually speaking. And there's a correlation between [00:02:00] stressors, wellbeing, and health, as we urbanize across the board.

And so there's a balance of benefits and burdens that occurs in terms of environmental quality and food insecurity in those urban spaces as well. And urban ag and urban forestry programs bring a set of stacked benefits, including social and community impacts, health, environmental, and social impacts as well. And so urban ag is best described [00:02:30] as growing, marketing,

distributing food in and around cities. Examples abound. There are many hybrids. It's very hard to place urban ag in one category. They are not usually all nonprofit or for-profit. They're usually fairly small in scale. And so the Cooperative Extension method is really about approaching urban agriculture, and also urban forestry, with applied research to identify problems that the communities designate, and also find those [00:03:00] with needs assessments and responses and/or interventions that are programmatic and monitoring those and improving them over time.

What are urban farmers' needs? We, in 2013, in UC ANR did a statewide needs assessment, finding the challenges and barriers, many of which are shared with rural farmers, such as land access, crop and pest and water management, and profit margin issues, market models. And also, our statewide urban ag needs assessment findings further included [00:03:30] the determination that we had soil quality and contamination issues to be worried about, zoning and city ordinances. Animal husbandry had historically been excluded from cities, and then the usual post-harvest handling and marketing and distribution. Additional concerns were around state and local regs, liability fines, heavy metals, small business risk management.

We have mapped about 160 East and South Bay urban farm, community garden, and school garden sites in ANR. [00:04:00] We're also developing partnerships across institutions and community-based agencies as well. This is one with a number of universities in the East and South Bay. And there are many issues across the board, including land access. Land use policy is another area we are providing some technical support on. In addition to that, the many opportunities, we focus on the cradle to the grave. We have a 19 garden daycare center garden [00:04:30] program through the UC CalFresh program, one of our proudest efforts.

So UC ANR and the urban ag and urban forestry programs within UC Cooperative Extension are about healthy food systems, healthy environments, healthy county residents for a healthy California, so that ultimately we can get to this, a multifaceted set of vibrant, multicultural communities with a plethora of benefits that are integrated between urban forestry, [00:05:00] urban ag, and all the benefits thereof. Impactful urban ag and forestry Cooperative Extension programs improve local environmental quality and increase local food security using practically applied land grant university research to help solve community identified problems. Urban food systems, long taken for granted, are the focus of city residents, municipal governments, and stakeholder groups, contributing to local economies, environmental conditions, and public health and a sustainable urban quality [00:05:30] of life.

In recent years, there's been a significant increase in farmers markets, community and school gardens, as well as urban farms in California and across the western states. Associated policy initiatives have also facilitated urban food growing and animal husbandry stewardship in cities as well. Cooperative Extension research programs ultimately help bolster all of those and augment

facilitated, [00:06:00] broad food system change. UC ANR and the Cooperative Extension System in the western states are poised to make that happen. My understanding was it was more on the five minute side, so I'm actually close to done. Hmm. Would you like me to do it? No, no, no, no. How about ... Are there questions?

Audience Member: [00:06:30] I have a question.

Rob Bennaton: Certainly.

Audience Member: What's one or two major metrics that you can point to say we're making progress towards that?

Rob Bennaton: Certainly.

Audience Member: When you talk about number of ... more farmers markets, is that a good metric?

Rob Bennaton: I would say for some in the communities in which we serve, but not necessarily all. One good metric would be increased healthy food access out of [00:07:00] corner stores. Another would be improved soil health and soil quality in urban settings and research on all of that. A third might be market-based models that really work between hyper-small scale urban food growers that have scale capacity issues and partnering with regional peri-urban and semi-rural farmers who have a capacity to meet a greater demand, but they may share similar values [00:07:30] and missions and goals in their farming philosophies and practices.

Audience Member: What about growing more landscapes towards urban [inaudible 00:07:40]? Is that ...

Rob Bennaton: Certainly. There are efforts across the board in the state of California called agrihoods. Those are often where there are private residential developments that are multifamily apartment complexes that have set aside spaces for growing food. On the rare occasion, they're on rooftops. Mostly, they're [00:08:00] at grade level and they're also about ... be in places where community interaction can be fostered. Yeah. Yeah, yeah, yeah.

One of the things about food access is really the affordability issue, so as we think about land access and urban land use policy around the concept of urban ag, which, again, you can't categorize as any one thing. It's not necessarily just for-profit or nonprofit, [00:08:30] often very much community-based, however, is to think about land access in terms of both public lands and private lands. As cities densify and their land values go up, the likelihood that food grown on vacant lots is going to be able to remain affordable if it's sold, is a challenge. At the same time, there are some state policies that have been implemented, such as Assembly Bill 551, which is now called Assembly Bill [00:09:00] 465. It's the Urban Agriculture Incentive Zone Act that is essentially a property tax incentive,

very much incentivizing food growing in cities. But, again, if the food is not affordable, who does that help? For whom are we doing these policy measures? Things to think about.

Thinking about public lands, and even if it's just in word as an unfunded mandate without providing any state legislature funding or local county funding, [00:09:30] if government considers endorsing the concept of planning commissions and parks departments and their commissions actually allowing for applications by low-income folks to grow food on some portions of their lands, you start to have an eclectic, combined program of private land use and public land use. But these are things to think about. It's a dynamic set of challenges. It's not all one thing all the time.

[00:10:00] I think some of the key research opportunities are around integrated urban ag and forestry that is also combined with increasing impervious surfaces, so rooftops is one of the big ones. Most buildings in California are not engineered for heavyweight loads, like where I'm from on the east coast. But there are patented low weight soils nowadays that can be used for rooftop growing and these serve as an opportunity, especially for affordable housing, [00:10:30] nonprofit organizations, that are developing, such as in the Tenderloin district in San Francisco, for example. Another one is soil health. A third might be, again, market models.

Audience Member: Thank you, Rob. I'd like you expand a little more on green job training. How are you engaging high schools or community colleges or some of your [00:11:00] own extension programs, which are doing the training? Is there something where NIFA should pay attention to?

Rob Bennaton: I would say certainly. Just to rewind for a second, I have two hats. I'm the County Director for Alameda and Contra Costa County Cooperative Extension over about 30 staff and about 1500 volunteers, and then I'm the Urban Agriculture Advisor for the Bay area in five counties [00:11:30] and developing a program from scratch over time. I'm about four years in now. And so I would say, over time, the opportunities around workforce development with green job training, both edible landscaping, landscape horticulture, and urban agriculture and tree management, care, and stewardship are massive. These are huge industries and they're really only on a trajectory of growth.

In the long run, I'm planning [00:12:00] on working with a couple of local high schools to do some teen training programs. They will be modeled off after an Ohio State University Master Urban Farmer program, but geared towards a slightly younger age bracket. One of the key things about these kinds of workforce development training programs is that they really need to offer, not just the experiences and the time and the apprenticeship or internship or fellowship opportunities, but also [00:12:30] the credential opportunities as well. Opportunities such as the American Soil Association, I believe it is, the Crop Advisor certification is one. There's a Sustainability Advisor, that's another. The International Society of Arboriculture offers tree management trainings,

where, after obtaining that credential, one can have a wage of 50 to 75 an hour right out the door, [00:13:00] pretty much, with six months of experience.

Taking into account what the jobs would entail and then working backward into what the trainings programs require is going to be a key part, and I think I'm just about ... Am I out of time? Yeah. Okay. Thank you. Yep. Yep, yep.

Jeannette: Okay. Great. Our next speaker is Gail Langellotto. Did I say it right? [00:13:30] Gail is from Oregon State University Extension. Welcome, Gail.

Gail L.: Okay. Deputy Director Qureshi and, really everyone from NIFA, thank you so much for hosting this listening session. I was very nervous coming into this and everyone from NIFA has been incredibly welcoming, and I [00:14:00] appreciate that. I especially appreciate the opportunity to come and share my priorities with NIFA. I'm truly passionate about my work and appreciate the opportunity to share this passion with others. My top priority in food and agriculture research, extension and education is consumer horticulture, and, today, I'm here on behalf of the National Initiative for Consumer Horticulture.

As my colleague, Missy Gable, already mentioned, consumer horticulture is the cultivation, use and enjoyment of plants, [00:14:30] gardens and landscapes, as well as related horticultural items and services. In one word, consumer horticulture is gardening, but, really, it is so much more. It's everything from landscape design and maintenance to arboriculture to even mulch and gravel services. Consumer horticulture includes the plants and the pots and the garden books that you might buy at a retail garden center. It includes home gardens, community gardens, school gardens, gardens in senior centers, and even in correctional facilities, public [00:15:00] and private botanical gardens, downtown landscapes and streetscapes. Given this diversity, it should be no surprise that our stakeholders are similarly diverse. Still, our group is unique because a lot of agricultural research has focused on the production end of agriculture, we're really focused on the end user of these agricultural products.

This group of consumers who uses agricultural products and services has largely [00:15:30] been underserved by agricultural research historically. This is in spite of the fact that we have an extensive and impactful outreach through land grant extension master gardener programs. Most of the research that master gardeners use has been derived from research that was conducted in conventional agricultural systems, and, of course, these systems vary a great deal in size and scope. They're very different than the normal backyard garden.

Extension master gardener programs have an incredibly wide [00:16:00] reach. We are present in every U.S. state except for one. Master gardeners are 83,000 in number, are passionate, driven, lifelong learners, accruing nearly a million hours of advanced continuing education hours per year and donating more than five million hours of their time. Master gardeners are charged with delivering research-based recommendations. Now we need to make sure that the

recommendations that they're delivering are derived from appropriate systems research [00:16:30] that they can share with their communities.

And consumer horticulture research is well poised to have large impacts. This is due, in part, to the spatial scale of consumer horticulture landscapes. The land area planted in lawns and gardens is extensive, 40 million acres of lawn in the lower 48 U.S. states alone, representing about 2% of land area in the continental U.S. It also is the largest irrigated crop in the United States, requiring [00:17:00] approximately nine billion gallons of water.

Research and extension in consumer horticulture is also well poised to make big impacts because just about everyone gardens. According to the National Garden Association's research, nearly 80% of all households participate in some form of gardening, indoor or outdoor, on an annual basis. And given this broad array of garden types, garden-related products and services, [00:17:30] the spatial extent of lawns and gardens, and the fact that just about everyone can be considered a gardener, it should come as no surprise that the consumer horticulture impacts are multifaceted. For example, the purchasing power of gardeners is considerable. In 2015, gardeners contributed 36 billion dollars to the U.S. economy, such that it averages out to the annual average household expenditure on gardening to be about \$400.

[00:18:00] In terms of the social impacts of consumer horticulture, we know that kids who garden eat more vegetables. This may be because they have better access to vegetables, but it could also be because gardening exposes kids to vegetables in a way which is fun and inviting. Did you know that it takes, on average, between 10 and 15 exposures to a new food before a child accepts that food into their diet? And of those 10 to 15 exposures, only one exposure has to be a taste. Touching, planting, growing, and harvesting food [00:18:30] are all powerful and positive ways to expose children to vegetables and fruits that they might not have had experience with, so that the mere act of gardening has a potential to both encourage and provide for the consumption of healthy foods.

One example of the positive impact of consumer horticulture on the environment is the role that gardens play in pollinator conservation. Research has shown that gardens support diverse and abundant and intact bee communities such that the abundance and diversity [00:19:00] of the bees in community and home gardens either approaches or, in some cases, actually exceeds bee communities in adjacent natural and agricultural systems. Investing in consumer horticulture research and extension will allow us to better identify the specific plant materials, designs, and management practices that will benefit economies, communities, and the environment, and to communicate this information to diverse stakeholders.

Although I've [00:19:30] given a few examples of the benefits of consumer horticulture, please know that the potential for consumer horticulture extension and research, research especially, is wide open. And this is because very little

research has been conducted in and for consumer horticulture landscapes. For example, of the 162 SCRI grants, which were given between 2008 and 2015, none of them had a consumer horticulture research component. [00:20:00] Conducting research in consumer horticulture landscapes will not only improve the extensive outreach delivered by extension master gardener programs, but also has great potential to have direct positive impacts on production agriculture, and this is because of the rapid transformation of landscapes that we're seeing.

The world is becoming increasingly urbanized, which means that urban areas are encroaching on areas which were historically more rural and that urban and peri-urban agriculture [00:20:30] are becoming increasingly more common. Understanding how to produce food in urban and peri-urban landscapes, often in diversified, smaller scale farming systems, will become increasingly important to building resilient food systems. Research conducted in consumer horticulture systems is going to be directly applicable to production methods in small scale diverse urban farms and vice versa. In addition, research at the interface of consumer horticulture and production agriculture will become [00:21:00] increasingly more important as divisions between urban and rural become more diffuse.

90% of the fruits, nuts, and berries and 78% of vegetables and melons are now grown in counties with significant urban encroachment. We need to understand the impact that consumer horticulture landscapes are going to have on adjacent agricultural systems. Just a few of the many questions, which could be addressed, include the role of consumer horticulture landscapes in sourcing [00:21:30] pollinators to nearby urban and peri-urban farms, providing refuge to pollinators from agricultural stresses that might be experienced on farm, building strong urban food systems that are resilient and connecting urban populations with agriculture.

And it should go without saying that research in consumer horticulture needs to be coupled with strong investments in extension. The stakeholders of consumer horticulture include just about everyone. [00:22:00] To reach such a diverse and extensive group, on the ground extension professionals are needed to translate research into information and to inspire the adoption of best management practices. Thank you.

Audience Member: [00:22:30] How is your initiative organized?

Gail L.: How is our initiative organized? We're really a grassroots organization that includes representatives from industry, nonprofit, and academia who've come together to try to identify high priority research and extension projects that we can use to serve the diverse stakeholders and consumer horticulture [00:23:00] industries.

Audience Member: How do you get together? Do you get together online? Do you meet once a year? Are you organized with a leadership framework? I'm curious.

Gail L.: Sure. Thank you.

Audience Member: [crosstalk 00:23:14]. I could have asked those questions.

Gail L.: We do have a leadership framework. We have a chair, we have a vice-chair, and then the secretary. We meet every other week via conference call. Because we are across multiple time zones, that means that I need to [00:23:30] get up at 6:30 a.m. every other Tuesday for a 7:00 a.m. conference call. We have met in person two times previously, and thank you so much, NIFA and SCRI, we did get a planning grant for this last term, so we have an upcoming meeting next July, where we're going to meet in person and really identify and articulate those high priority research and extension projects. Thank you.

Jeannette: [00:24:00] Okay. Our next speaker this afternoon is Alvar Escriva-Bou. You're going to have to help me with that. Alvar is from the Public Policy Institute of California. Nice to meet you.

Alvar E.: Hi. Hello. I'm Alvar Escriva. I'm a research fellow at the Public Policy Institute of California. We're a nonprofit, an independent and [00:24:30] nonpartisan research group that do research in many issues, but I specifically work with the water policy center. I'm going to talk about water. It's, as all of you know, one of the main inputs that we need to grow food. What I'm going to talk about are economic tools to try to adapt for new conditions. In California, we have had over-exploitation of our aquifers. [00:25:00] We have been over-drafting most of them and there are new laws that ask for sustainable groundwater management. And this is an issue that can affect greatly agriculture here in California. And it's not only California. We also know that many other western states have similar issues, so we think that this is a great opportunity and, thanks, NIFA, for granting this to scale up some of the approaches that we are taking.

As I said, [00:25:30] I'm going to talk about economic tools and some examples to apply in the San Joaquin Valley. The San Joaquin Valley, it's one of the most important agricultural regions, not only in California, but also in the United States. It produces 50% of the economic output of the horticulture in California. It's over 25 billion dollars in revenue every year. But there's also other issues. We also like to [00:26:00] present this thing that it's also societal or a sociodemographic issue in the Valley because, as you can see in the right bar chart, employment, GDP, and revenues in the valley are really impacted by agriculture. Over 20% of revenues are directly or indirectly related with agriculture in the Valley.

[00:26:30] We are representing here how farmers have been adapting throughout time. This is crops since 1960 and, actually, this is economic output from different crops. And what we can see here is that we have been increasing steadily our economic output in the Valley. During the last year or something, this is the yellow area that you have there, it has been related, [00:27:00]

especially, with orchards and vegetables, but also livestock, it's a really important kind of farming, partnering in the Valley.

The problem here, the Valley faces a long-term water imbalance. We have been relying on this ... This is a thing that has been highlighted during this last drought in 2012, '16 drought, but it's a historical thing. We have been doing the same during many, many [00:27:30] years. We did an assessment that we released this March. We assessed that about 13%, it's in the right, up on your left, sorry, pie chart, about 13% of the water used in the Valley is actually unsustainable groundwater. That's a problem. If we want to manage that sustainably, that means that we have to reduce at least 13% of our water use.

[00:28:00] The state, in 2014, passed a bill saying that we have to form new groundwater sustainability agencies and develop sustainable plans for the future, so we have to reduce this actually to avoid this imbalance and to be balanced over the long term. As I said before, we have to reduce this at least 13% of water use or [00:28:30] get new supplies. It's kind of challenging. But there are many other consequences and especially this is a really important issue in the San Joaquin Valley and this is because of that, that we are focusing here. As you can see in the map, these kind of orange-red basins are the San Joaquin Valley and these are the critically over-drafted basins in California. Most of them are in the Valley.

But it's not only about water. There's many [00:29:00] other issues related with water and agriculture in the Valley. We have nitrate problems in the in-groundwater that is affecting actually drinking wells. We have salinity in most of the west side of the Valley, that also limits crop productivity. We have a really poor air quality, one of the worst air qualities in the region, that if we also go with more water scarcity, [00:29:30] we can increase this dust and falling lands. And we have also a highly altered natural ecosystem. Our approach is that you cannot take one kind of single problem alone. We have to try to look at all the ecosystems together and all the problems that we are facing in the Valley.

What we have seen, and I will talk in the last slide about our [00:30:00] report that we already released, is that we need flexible adaptation strategies, but there are many hurdles that can impede them. For example, we have institutional hurdles. In the map that you see there, every one of these small circles, it's a groundwater sustainability agency. There's over 250 that has been just formed this year, so you have more than 250 groundwater agencies. We have thousands of irrigation districts, cities, [00:30:30] so there's a really complex institutional system over there. We have many regulatory limitations. There's lots of problems, or challenges, with farmers' behavior and how they behave in the future with these limitations. And also there's infrastructure constraints.

We came here because we think that there are economic tools that can support adaptation. When you ask about what's the major problem in the Valley, it's adapting [00:31:00] to groundwater sustainability, to me, can generate many economic disruptions because a big chunk of water that we had to take out and

that's a big economic problem. For the solutions, we think that there are economic tools that actually can help in adapting to this new scenario. We have just some examples that we have seen that are being researched right now. We need incentives, economic incentives, to promote [00:31:30] groundwater recharge during wet years. At the same time, that we allow extra pumping during droughts because it's the way that the system works in the Valley.

There's already studies working on this, [inaudible 00:31:44] studies, on how much water is available to recharge and which tools of these economic tools could we assess, all the things that could help out our water markets to reduce the economic costs of groundwater limits. [00:32:00] We could reallocate water to the most valuable uses, at the same time that we have to take into account equity issues and other issues. And, finally, also there's another example that could be mitigation tools to mitigate, sorry, externalities because if we keep pumping more during dry years, as it will happen that we'll dry more wells. But [00:32:30] if we plan that in advance, we can propose mitigation tools to farmers to pump over these years, but, at the same time, to pay for these domestic wells to be replaced. But we have to plan that in advance. There's a few irrigation districts that are already implementing this.

As research opportunities, what I already said, there are many specific research needs there. We are already exploring some of them, but we think that there's [00:33:00] a need for many more. There's needs for overcoming these barriers, these institutional barriers, these behavioral barriers. Second, there's needs to investigate these new approaches, these economic tools, to try to help adapting to the new conditions. And, finally, also to scale up these successful experiences because it's a really complex landscape and we have to promote these successful experiences.

[00:33:30] As I said, we already published a preliminary report in March. It's called "Water Stress and a Changing San Joaquin Valley," and we are working now on a book-length report for next year. But I think that these problems will take much longer to be solved, so there's a lot of need for new research here. That's all. Thank you so much. I'm open for questions. [00:34:00] Any question? Yeah.

Audience Member: You're referring to them as economic tools as opposed to technology, which is what other people would rather say, "We should explore new technologies." Why are you using economic tools? What's the context of using economic tools?

Alvar E.: Because I think that ... It's a really good question because we are proposing [00:34:30] here there's many other technological issues. There are technologies that are being explored and actually are being applied, and we actually rely on that. I did my ... I'm a grad student from UC Davis and there's many links from the UC Davis tech industry with the ag industry. But there's most of these economic tools that we mentioned about economic tools are practical [00:35:00] issues that don't need a technology behind that, only need an institutional and a legal agreement on the kind of behavioral way to work with

and that can promote, adapt to new conditions, can reduce the economic cost of adaptations. Any other question? Thank you so much.

Jeannette: [00:35:30] Okay. Next up, we have Sean Hogan. Sean is from the University of California Division of Agriculture and Natural Resources.

Sean Hogan: Hello. My name is Dr. Sean Hogan. I am from the University of California Division of Agriculture and Natural Resources, or UC ANR for short. I'm afraid I didn't bring a PowerPoint today, but rather [00:36:00] a statement that my division thought would be important to add to the conversations at this event. Previous speakers have spoken about the importance of agriculture for the economy in California and the country at large. This progress has been long on the coming. American farmers and ranchers today produce at a level of efficiency, volume and diversity that was unheard of only 20 or 30 years ago. Much of this progress has been due to innovations in production [00:36:30] technology, such as improved seed varieties, field equipment, irrigation and nutrient delivery systems. Production technologies like these continue to improve, but at a slower pace.

Today, the big challenges that stand to unlock the next set of incremental gains is the compelling need for innovations in information technology. It's not that we don't have data to help growers plan and manage production. [00:37:00] We are, in fact, awash in data. Thanks to dramatic improvements in sensor technologies, data transmission, storage capacity, miniaturization and robotics, we have data coming out of our ears. From wireless field sensors that measure everything from soil moisture to plant NDVI, to drones that collect high-resolution imagery on demand in both visible and infrared parts of [00:37:30] the spectrum, to processing equipment that can rapidly measure the physical and chemical properties of the harvest, we have unparalleled amounts of data to help growers fine-tune their operations to deal with inherent uncertainties in agriculture. And all of this is getting cheaper and cheaper as the technology matures.

The main challenge, however, which we have barely started to address, is turning this massive amount of data [00:38:00] into usable information. There are three hurdles that need to be overcome. First, these systems were not designed to talk to one another. A farmer who wants to compare yesterday's soil moisture readings with today's drone imagery to fine-tune tomorrow's rates for the irrigation system has a major technological hurdle ahead of them. The protocols for data interoperability in tools that bring together one another [00:38:30] under this dashboard are simply lacking or in their infancy. The industry needs leadership that can get everyone into one room, bringing together growers, industry, and academics to figure out how to get data collection systems to speak to one another.

The second challenge, which is connected to the first, is that the analytics we use have not kept up with the data. Many of the standard techniques for data analysis we use today were developed decades ago [00:39:00] for analyzing

data from satellites and weather stations. Today's data is richer and finer grained. As an example, we routinely create three-dimensional models of orchards, within my personal unit, and field crops using drone data. This is not hard to do, but little is done with this structural data outside of research projects. Another example where data is frequently thrown away [00:39:30] is the extremely fine-grained detail we can get from drone imagery and other sensor networks. More often than not, this detail is simply averaged out. We could take a lesson from medical imaging, which has learned decades ago to use artificial intelligence techniques to rapidly scan for and find abnormalities in high-resolution imagery.

The third challenge that we see all the time is getting the development [00:40:00] of information technology out of the research labs and into the farms and ranches. Scientists like myself are good at working with data and we understand plant and animal biology, but we're not familiar with the 99 other things that growers need to deal with, from labor to timelines to financial realities, internet connectivity, and privacy issues, among others. We need collaborative projects with benchmarks [00:40:30] for success, where the benchmark for success is not another publication or patent, but a set of tools that meets the actual needs of growers, including small and medium-sized operations and those working with specialty crops.

Improved information technologies and sciences that advance the connectivity of systems are the low-hanging fruit that will allow us to better leverage the huge and growing amount of data for the next generation [00:41:00] of agriculturalists to improve their efficiency and sustainability. Land grant universities, like the University of California, are well positioned to develop tools and technology, but we need the support and leadership from agencies like the USDA to bridge the divides and all work together. And with that, does anybody have any questions? I also prepped for about [00:41:30] a five minute talk, and so ... Yes.

Audience Member: You mentioned this link between research science and practical procedures on farm. How would you improve that?

Sean Hogan: Well, that's part of the conversation that has to be convened between the groups, but, right off the top of my head, I'm thinking in [00:42:00] terms of making technology very accessible and easy and very financially advantageous. Just a quick example of that would be maybe application programming interfaces that can net units to some kind of centralized or enterprise systems that helps the growers or the agriculturalists manage their systems in concert and not just separately. That'd be something that would be an example. [00:42:30] Any other questions?

Audience Member: Have you thought about how this interface between, say, private and public would work also? When you have big investments with many of the agricultural companies like John Deere or so forth, how does the role of the public institution fit along with that?

Sean Hogan: Well, one of the mandates of UC ANR and the land grant [00:43:00] university system is Cooperative Extension engagement with the public because the public space is where ... it's the laboratory of what works, where the rubber meets the road. And so the connections between private industries, as you mentioned, John Deere, they're at the forefront using technology and testing whether it works or not and so, therefore, one of our objectives would be to definitely be [00:43:30] engaged with groups like this and others.

Audience Member: What's the scale of farming that we can impact here? Are we targeting the small and medium-sized farms, which are a lot, but is that the effective target that we can invest in to make these types of accessibility to that kind of information? [00:44:00] Because this is public information, what we and the federal government will do is invest, and the obligation is to make that information public. Is that direction is where our collective efforts can make that different? Then I'm thinking of the mega farm, large, rural cropping industries as well because they get to [00:44:30] play in that space as well.

Sean Hogan: My personal opinion on the matter would be that the goal would be to develop tools, protocols, and methods that are transferable between any level. The larger enterprises will potentially benefit the most, but those same tools that are becoming cheaper and cheaper are more accessible to the smaller growers and just as applicable.

Audience Member: [00:45:00] Thank you.

Sean Hogan: All right.

Audience Member: Thank you very much.

Jeannette: Thank you, Sean. Okay. Your agenda doesn't have our next speaker, but she would like to come and give some comments as well. Let's have Donnell Brown, there she is, come on up. Donnell is from the National Grape and Wine Initiative. Welcome, Donnell.

Donnell Brown: [00:45:30] Hello, and thank you for having me. As Jeannette said, I'm Donnell Brown. I'm with the National Grape and Wine Initiative. We're a nonprofit organization that advances research for the American grape industries, hoping to make us more competitive and have higher quality across wine grapes, table grapes, juice grapes, and raisins. And I just have a brief statement about our priorities and opportunities for research.

[00:46:00] Grapes are the fastest growing specialty crop in the United States, from all of the ones I just listed. We have the largest plant value of all the specialty crops, especially when the economic impact of wine is included, which was recently announced at roughly 220 billion dollars annually. Research funding is vital to the future of the grape and wine industry and our economic contribution. But, although the USDA has long been [00:46:30] one of the top

fundors for research, it's funding has not grown for research. Which is to say that, in real numbers, our nation's investments in its farms and foods is shrinking.

Specialty crops, like grapes, have been historically underserved by general research funding programs and vital research funding comes from NIFA's Specialty Crop Research Initiative and Specialty Crop Block Grant programs and competition is fierce, but the need and urgency [00:47:00] will only accelerate as we seek to make much needed strides in plant breeding, genetics, and genomics to improve plant characteristics and adapt to a changing climate and race to identify and address threats from pests and diseases.

A lack of labor is a critical threat to the long-term viability of all American crop production. With the farm labor supply reaching crisis levels across our vineyards and farms, research is desperately needed [00:47:30] in automation, mechanization, and efficiency technologies, not only to address decreases in labor, but to enhance the productivity and skills of our existing labor workforce. And extension is vital to delivering scientific outcomes to industry, but it has suffered greatly from a lack of funding. Extension appointments are being eliminated or combined across crops, such that growers' needs greatly outweigh agents' capacity to [00:48:00] provide meaningful outreach.

Through its Agriculture and Food Research Initiative and SCRI programs, NIFA has helped to sustain this work, but more must be done, less this function disappear completely. As NIFA director Sonny Ramaswamy has said, "Funding research to respond to these challenges should be considered as an investment in our nation's future, an investment that will pay big dividends in the years to come." Federal [00:48:30] funding has certainly helped to improve the competitiveness of U.S. grapes and grape products, and we hope to maintain a strong and vibrant connection with NIFA and the USDA in years to come. That's all I have. Thanks. No questions, right? Thanks, guys. Almost.

Audience Member: [00:49:00] Thank you for the call out on the Specialty Crop Research Initiative. How do your industries look at the need for automation, efficiency equipment, and such, and how does that all fit with, again, with innovation, with workforce development, the transitions, particularly when labor is so short, and it's critical with the industries right now? How would be the best ways for us to move that forward?

Donnell Brown: [00:49:30] Gosh, that's a really big question. With the grape industry, if you take the wine industry in particular, people look at wine through this Vaseline-smearred lens. It's very romantic and people think that we're all drinking wine all the time and it's lovely, and it's really hard work. And I have heard from certain vineyards that, for example, the mechanized vineyards look very different [00:50:00] than your traditional vineyard. They are not nearly as pretty as a traditional vineyard, so vineyards take pains to hide those vineyards from the public because there's a lot of public perception and pressure to maintain that kind of romantic vision.

I don't know that I'm speaking for the whole industry, but I would say that things [00:50:30] have to change. The labor is decreasing and aging out. There aren't a lot of people coming into agriculture. Even family farms and vineyards, the next generations aren't coming into the business. Mechanization and automation are things that we have to look at. And someone mentioned earlier, the dignity of the workforce and this will mean changing jobs. As [00:51:00] automation and mechanization comes into play, these mean different types of jobs for people who have been in agriculture for a long time. Did I answer your question?

Audience Member: Yeah. Can I do a follow-up on that then?

Donnell Brown: Sure. Yeah.

Audience Member: With the commodity crops, efficiency, large scale consolidation, decreasing number of total farms and so forth, is that really the model for specialty crops, or could it be going to more of a distributive model, more of [00:51:30] a right size model, some other scale than considering just strictly getting larger and larger for efficiencies?

Donnell Brown: I'm not sure I'm going to be able to answer for all specialty crops. I would say, in the grape industries, there's an awful lot of handwork that will still remain. Automation, mechanization, these things can scale up and down. I suppose there's probably a hurdle in [00:52:00] technology investment, in terms of the cost of these things. I'm not sure I can answer for all specialty crops, but these are things that need to be employed, certainly, in vineyards. I didn't think I'd get off without Louie asking a question.

Audience Member: Jeff had a very interesting train of thought. [00:52:30] Does the grape and wine industry tend to keep itself in that smaller scale, artisan approach to their product, rather than what Jeff was asking? But in other agricultural areas, they tend to scale up because of other capacity or producing these pears or something like that. In this case, we [00:53:00] are producing a product that has some other artisanal value as well. Is that the kind of ... because we then look at this type of specialty crop in a different way because it has a certain other value because it's wine. It's got-

Donnell Brown: Right. There's a product, and endproduct as well.

Audience Member: [crosstalk 00:53:20] Yeah, and there's a perception on that product of quality being ... of what expectation for that as well.

Donnell Brown: Well, in the wine industry in particular, [00:53:30] there are a number of business models. There are people who are retired from a long career in, let's say, technology and now they just want to have this fun thing to do on the side and they don't necessarily need to make as much money as a small producer, whose family farm, family vineyard, that's been third generation and that

vineyard is their business. There's a lot of different models in the wine industry. Certainly, [00:54:00] you mentioned wine is a product. There's juice also as a product. Table grapes are their own sort of very aesthetic driven, beautiful thing that has a lot more touches than any other grape crop.

It could be different from other specialty crops, the grape industries in general, but there are so many business models within. You've got larger ... [00:54:30] There's Welch's, that has a cooperative of growers to Bronco Wine, for example, that works with lots of different growers, some of whom they've bought and some of whom they contract with. There's so many different business models and different sizes of farms and ranches and it's a little hard to answer the question, but it's ... It makes it challenging, yeah.

Audience Member: Thank you.

Donnell Brown: Sure. Oh, [00:55:00] there was ...

Audience Member: Hi, how are you?

Donnell Brown: Good.

Audience Member: I understand that the organic industry is significantly growing. I'm wondering if you're seeing a subsegment of growth in the organic wine industry, specifically focused on biodynamics, alternative growing practices, polycultures for ground cover, maybe sheep. I've seen one or two groups that are using sheep among their land uses [00:55:30] in conjunction with the wine growing. That's the question. Thanks.

Donnell Brown: Okay. Well, unfortunately, we don't, as an organization, really specialize in focusing on organic production, so it wouldn't be right for me to even try to answer your question, other than just my own observations of just reading the literature, but I really can't. I would say probably yes, there's been a growth in organic. Sustainability is a sort of a broader, [00:56:00] more top of mind at the moment, that covers not just the kinds of methods, the things that you're using for nutrition and pest management, but also to labor issues and how we deal with environmental issues, so sustainability as a sort of an umbrella topic is a little more in my wheelhouse, but [00:56:30] I can't really speak to the organics at this moment. Is that it? All right. Thanks.

Jeannette: Okay. We have one more speaker that I'm aware of and if there's someone else in the audience that would like to speak, please let me know. We certainly have plenty of time. Next up, we have David Ginsburg from UC Davis. David.

David Ginsburg: Thank you [00:57:00] very much, and I really have to say that I think the presenters before me really highlighted the importance and passion and the breadth of what NIFA represents and the programs that they have associated with it, and more so the impacts that we have on what we have as our research

findings, but more of what's going to be happening in the future and the trends of what research needs to support. And I really have a fortunate [00:57:30] opportunity to be working at the University of California Davis. I direct the UC CalFresh Nutrition Education Program, which is a SNAP-Ed program, and we really are able to work with the other university campuses, as well as the division of UCD Ag and Natural Resources through the Cooperative Extension Offices.

And there was a comment that was brought up earlier about the application of translational research. And from the campuses where research is provided and development of curriculum or doing research [00:58:00] on programming or, again, the spectrum of what was covered today, we have the opportunity to do the campus to community continuum of bringing the research to the community to the people we serve through the Cooperative Extension Offices. And it's a phenomenal way of extending the important research and also the various programs that are developed throughout various organizations, but also because we represent [00:58:30] the universities, it also gives us the credibility and the community that often isn't always supported or recognized by others.

While at the University of California, we were able to get a grant from NIFA to work with both NIFA and the Food and Nutrition Services. It was called the Align and Elevate Grant. And this brought an opportunity to bring both Dr. Ramaswamy and also, at the time, administrator Audrey Rowe together to really look at the synergy and [00:59:00] the partnership opportunities that both the FNS programs brought forward, along with the programs around what NIFA provided, but more so in the area of nutrition and community engagement. Again, it really was a landmark opportunity where the two administrators got together to really look at what could be the opportunities for building synergy.

And the reason I bring this up is because I think SNAP-Ed plays a real crucial role. It is really aligned often with extension offices nationally, and it really allows [00:59:30] us to accentuate what is happening within the NIFA programs and, particularly, what is happening in California with the ag and natural resources. And it really looks at the opportunity of building towards, again, what we were discussing here, like the master gardener programs and really looking at what we're doing in our educational opportunities with edible gardens and the partnerships that we've been able to build by creating gardens in schools.

And one of the previous speakers talked about what we did with our early childhood education programs. Also, looking at how [01:00:00] we have this link to our youth engagement efforts within our SNAP-Ed efforts, within the University of California, we're reaching 100,000 youth and we've been serving them. But in the last year and a half, we've transitioned to really looking at how we can engage them and look at ways where they can be partners and be future leaders, whether it be for career readiness or whether it be for peer-led education or whether it be through youth participatory action research and really giving them opportunities to really engage in the programs that we're doing.

Examples are, we've had [01:00:30] peer leaders, or what we call Teens as Teachers, providing programs in gardens, creating produce stands. Instead of selling popcorn and candies and things like that, they're able to have on a biweekly basis selling produce that, again, they've grown in their gardens. We also see that they're able to bring programs into the cafeteria and our partnerships in the cafeteria have allowed us to really look at issues around procurement. We're also looking at how we can make sure to maximize the foods being served through tastings, and [01:01:00] then also looking at the opportunities to reduce food waste through plate waste studies and things like that.

Again, I think our programs linking with the 4-H program, the master gardener program, with our [F Net 01:01:13] program and expanding broader than some of the aspects that they do. I think they're great partners and they can work together very well. And then we also look at the economic stimulus, so, again, many of the presenters were talking about the ag and growth and things around that. And so we're able to, through our educational programs, [01:01:30] promote the produce that's being grown in our communities and really create a demand for those products by educating the folks that we're reaching out to to be able to, again, put a demand on that produce, and so it becomes an economic stimulus.

And there's examples where grants have come in for bonus values, where if you go to a farmers market and buy produce with your SNAP benefits, you're able to then be able to get a two-for-one value. Again, it creates a stimulus for the small farmers who are coming [01:02:00] to the farmers markets to be able to see their products. Again, two-for-one is great for our participants, many of them who are food insecure. Again, it also brings diversity because our project is really serving a very low socioeconomic strata. It brings in a diverse audience that, again, links to these programs.

With limited resources and reduced funding and an uncertain future, it's really important to look at how we build the synergies between our various programs so that [01:02:30] we can really maximize the efforts that we're bringing forward. Again, it's a great opportunity that we see, again, partnering across the USDA programs and really demonstrating that impact here in California. Thank you very much. This one ...

Audience Member: [01:03:00] In terms of school facilities and early childhood centers, do you see long-term growth in terms of community use agreements, where parents and other community members are also connecting with those gardens as well?

David Ginsburg: That's a real difficult question because, again, you've got the joint use challenges sometimes of being able to use [01:03:30] school lands as public use and the jurisdictions that govern both of those. There are a few examples where that's occurred where, within the school grounds, they've been able to develop a community garden, a shared garden, and things like that. Some of my colleagues in other departments with the California Department of Public

Health are looking at land use partnerships and the opportunities to look at joint use agreements.

I do think that's important, and I think this is something that, again, SNAP- [01:04:00] Ed has allowed us to be able to begin working on those things. And I think, as we learn more about some of the ways to break down the barriers between the different silos of the different organizations, we could possibly look at that as a real opportunistic way of really using property that's not used often during the summer months when schools are closed down and the highest growing season of the year, so good question. It's something that should be pursued more.

Jeannette: [01:04:30] Okay. Anyone else that has any additional comments they'd like to make? Okay, if not, it's been a wonderful session. It's been a wonderful day in Sacramento, but, before we leave, I'd like to invite Dr. Qureshi to give some final comments.

Dr. Qureshi: [01:05:00] Thank you, Jeannette. Well, what a day. When our current secretary, Dr. Sonny Perdue, went through the hearing process and was confirmed, he coined a statement about the largest federal department, which is USDA, which said, "Do good and feed everyone." Just [01:05:30] think about it. It's a very powerful statement. I think the fact that you all took the time to come here today to share with us all the good you are doing through research, education, and extension, and reaching out to the communities, getting their input and fine-tuning your programs so that they truly address their needs is really all the good we are talking about.

And feed everyone, [01:06:00] not just means producing abundant food. We are already very blessed in this country to have the safest, the nutritious, the most abundant food that we can think of, but also we are leader of the world. We do feed, not only people in this great country, but across the world. That's a great responsibility. We got a lot of great ideas today in [01:06:30] this production, agriculture sort of overarching phrase, a lot of sustainable approaches under numerous categories, I would say.

But, as we say in NIFA, that we are not bench scientists anymore. We enable folks like you to do good and feed everyone, and I think all what you have [01:07:00] suggested to us today, that's exactly what we are looking for, to strengthen this partnership between the land grant university system, the Cooperative Extension system, and of our larger external stakeholder partners, the nonprofits, the other federal partners, the commodity folks, the growers, the producers. We are having fantastic, [01:07:30] huge list of very, very valuable ideas.

If you want to read more about what we heard at other regional places, because each region kind of have its own flavor as well, although there are a lot of commonalities. We have presentations from Kansas City, as well as Atlanta already on NIFA Listens website. We also have already, believe me or not, a

complete transcript of every word which was said [01:08:00] on those two sessions, so you could read the conversational items as well. And also we will have these presentations, along with the transcript available from Sacramento meeting, on our NIFA Listens website.

I assure you that the reason why we were having these listening sessions and the last one, hopefully, would be as successful as this one, [01:08:30] is that these feedbacks would really, really inform our budget priorities. We are not just doing it to feel good that we came here and we talked to you and you all came and talked to us. And, yes, that's a good feeling as well. I think this reaching out builds the sense ... further strengthens our partnership, but we want to make these purposeful. And, for us, believe me, the purposefulness comes when we take these ideas [01:09:00] and prioritize them, let these ideas inform what our budget priorities ought to be for 2018, 2019, and beyond, but also take these ideas and put them back into our requests for applications and have these ideas really implemented through research, education, and outreach type of an activity.

Thank you so much. I [01:09:30] can't thank you enough for taking the time and coming out. But I'm also very, very grateful to my NIFA colleagues here today, who really have done tremendous work in the background to make these sessions successful, all the colleagues who are here today and all the colleagues who are not here, but are back at the headquarters. Thank you, everybody. We stand adjourned til Greenbelt, Maryland. [01:10:00] Our website is still open til December the first. You're still very welcome to provide comments electronically and reach out to those who possibly could not be here, but we look forward to seeing you and our partners next in Greenbelt, Maryland, so we stand adjourned til then. Thank you. Thank you so much.