SECRETARY'S ROUNDTABLE: OPEN DATA FOR AGRICULTURE AND NUTRITION

Moderator: ***Alexander B. Howard***
October 15, 2015 –3:15 p.m.

Introduction:

Ambassador Kenneth M. Quinn
President - World Food Prize Foundation

To introduce the secretary and the panel, I want to introduce to you a personal friend, a great scientist, a woman who is a role model for all of the women that we want to inspire, and young girls, young women this week, who has been secretary, who was dean of the College of Agriculture and Life Sciences at Iowa State University, where I first met her, and after that was at MARS as a vice president and now has been Under Secretary of Agriculture, Chief Scientific Officer of USDA, my friend, the Honorable Cathie Woteki.

Cathie Woteki
Under Secretary of Agriculture, Chief Scientific Officer, USDA

Thank you so much, Ambassador Quinn. My task this afternoon is to orient you to this next roundtable discussion. It's become known as the Secretary's Roundtable. This topic is going to be "Open Data for Agriculture and Nutrition," and I'd like to invite all of the participants, the Secretary of Agriculture and his guests for the roundtable to come join me up here on the stage. And while they're making their way here, there should be on your seats some background information about the Global Open Data for Agriculture and Nutrition Partnership and a publication that they have put out. A little brochure also tells you a little bit more about the organization, and there's also some information about how you might become a member if you choose to do so.

Helping us today with this discussion is Alex Howard. Alex is the first Senior Editor for Technology and Society with the *Huffington Post*. He's been blogging about technology and civil society issues for several years now at e-pluribusunum.org, and he's really well versed about this topic of open data. My boss is the Secretary in this roundtable, Secretary Tom Vilsack, the 30th Secretary of Agriculture. He is well known in the state of Iowa. He had a law practice in Mt. Pleasant, was elected to the state senate and served two terms of governor here in the wonderful state of Iowa and is entering just in a few months his eighth year as the Secretary of Agriculture for the USofA. Joining the Secretary this year are Chancellor Emeritus Brady Deaton of the University of Missouri, and Brady has, since stepping down as chancellor, been the Director of the Deaton Institute for University Leadership in International Development. President Obama appointed Dr. Deaton to be the chair of the Board for International Food and Agricultural Development, and he's been serving in that capacity for several years.

Finally, this is a high-tech session, and joining us remotely from London is Gavin Starks. Gavin is the CEO of the Open Data Institute. He's a great believer in how data can change the world and from his vantage point at the Open Data Institute, he's going to be interjecting, I think, a great international dimension into this. So, Alex, I leave this to you.

Moderator:

Alexander B. Howard
Senior Editor for Technology and Society, *Huffington Post*

Panel Members:

Thomas J. Vilsack	Secretary, United States Department of Agriculture
Brady Deaton	Executive Director, Deaton Institute, University of Missouri and Member PUSH Steering Committee
Gavin Starks	CEO, Open Data Institute (ODI)

Alexander B. Howard

I'm happy to say that my father was born in Clinton, Iowa, and I have an aunt and uncle and numerous cousins who are here; so it's a pleasure to be back in the state and to be with you here and with Gavin, who joins us virtually. So thank you for all coming together.

Below your seats you'll find a flyer, which will give you some useful context for the virtual component of this dialogue. As is the case with just about any kind of event these days, there is a virtual component. There's a hashtag, which you all have been merrily tweeting on. It's #FoodPrize15. I think you'll see there's a pretty robust conversation. And in the latter half of this discussion, I'm going to do my best to get you all into this conversation as much as possible, which really fits this moment when we're all discussing what's happening more or less in real time. To really kick things off, though, I wanted to frame this a little bit.

How many people in this room have heard the term "open data" before? Wow! That is one of the most educated audiences I think I've ever seen in this term. That's fantastic. Well, for the ones that didn't put up their hands, the idea here is this is data that anybody can use. It's freely accessible. It's often these days called "machine readable," which means it's structured in such a way that something else can ingest it, usually a computer; and it is open in terms of the licensing, so that somebody else can use it without restriction. That's the most basic definition.

And if you go online to GODAN.info, you'll find lots of information about the thing we're here to talk about, which is the Global Open Data for Agriculture and Nutrition initiative. Secretary Vilsack, I know you've been a big part of this. Why is this something that the nation should care about and make a national priority?

Vilsack Well, I tell you, it's great to be back home, I might say, and certainly want to appreciate Ambassador Quinn and his leadership and the Ruan family leadership in the World Food Prize. It's a great opportunity for us to get together. This is an important opportunity for us to talk about the data we have on global food security and trying to respond to the challenge that we collectively have in meeting the needs of an ever-growing world population. It's important, because it creates an opportunity for us to collaborate. [inaudible] It requires a great deal of collaboration and thought in terms of how to [inaudible] deal with a changing climate, how to respond to some of the pests and diseases that are becoming more prevalent. And the more information we can share with one another, the more productive we will become, the more efficient we will become in developing these solutions. And so it was important to create a vehicle by which nations, NGOs and others could collaborate, come together, create a system and structure for the sharing of this information. And now over 140 partners are part of GODAN, and we are encouraging those who are here today to consider being part of this partnership. And I'm convinced that, if we do the right thing with this, that we will see a lot of interesting, creative, innovative solutions bubble up through the process. And I think that's the last point I would want to make is, in addition to being more efficient, in addition to focusing on collaboration, it's really creative problem-solving. And that's what open data… it creates a real great opportunity to open it up to the brightest and best minds in the world.

Howard Thank you for that bit. Gavin, nice to see you. I'm looking around the corner here at your face. I feel like I should come and look you in the eye here sideways. For those that aren't familiar, Gavin started up a very interesting place called the Open Data Institute, and they're no stranger to this idea. Gavin, can you talk a bit about what ODI is and how you're involved with open data and agriculture?

Starks Certainly. First of all, thank you very much for the invitation to join you today. My apologies, I can't be there in person.

The Open Data Institute was founded only three years ago by the inventor of the Web, Sir Tim Berners-Lee and Sir Nigel Shadbolt, when independent nonprofits headquartered in London, backed the UK government in part, backed by the Omidyar Foundation, and backed by our commercial partners, which includes companies like Syngenta and other companies in the agritech, and agriculture and nutrition space, as well as across a whole range of different sectors and initiatives from health to education to the built environment.

What we really see here is the evolution of what we call the web of data. And what's happening is something that's actually going to be bigger than the Web is today. We've seen over the last 26 years a huge growth in the Web, the amount of things connected to the Internet. There's nearly a billion websites now. One interesting fact is there are now more people connected to the Internet than were alive when I was born. So I think the pace of change here is phenomenal.

When we look forward, even in to the very near future, we see more devices connected to the Internet than people, and there are estimates of between 20 and 70

billion devices connected to the Web. So these things together—people connected to the Web, machines connected to the Web—really create a different kind of environment that we are able to work in. And very much to the last point, what this enables is open innovation that enables people to collaborate at scale in a way that we've just never seen before.

And so our role in this is to try and help bring together a whole range of different assets. We bring together policymakers, businesses, startups, individuals, NGOs, and try and get everybody at least speaking the same language. And thank you for the definition, which saved part of my job there in defining the scale of open data. But we also look across the data spectrum, so we look at closed data, shared data and open data, and how can we combine all of these things. And really interesting examples, I think, of how people are starting to think, actually there's more value to opening up our information than there is in the idea of keeping it closed. And so there's some really interesting transition in business models there as well.

Howard Thank you very much, Agent Gav. I appreciate hearing from you. That is, of course, his Twitter handle. If you're looking on your, you'll see he's very accessible there. So you are involved with GODAN, in the context of something called PUSH.

Deaton Right.

Howard Can you talk a bit about what that is and what the relationship is?

Deaton Yes. PUSH is Presidents United to Solve Hunger, and it's a movement really that began about three years ago at a Universities Fighting World Hunger Conference in Auburn University. There was a pre-summit of university leaders who wanted to address the issues of global food security and hunger and poverty and improve nutrition around the world. And these presidents of universities felt that we're doing a great deal within each of our universities and colleges to address these issues. Students are pressing on this issue. And I was chancellor at the University of Missouri at the time, and I could really testify to the incredible strength that students were bringing to these issues, very inspired, very tech savvy, very knowledgeable, very committed to getting knowledge wherever they could to address the issues.

So this group of presidents, it's now grown to over 80 signees, because during that conference, as they said, "What can we do together?," they created a document, actually. It was a consensus agreement to address issues of food security. And I believe we have copies of that document here. If anyone else in university leadership wants to sign this and become a member of PUSH, we would welcome that.

The PUSH has been very active in supporting open data, because universities, whether they're major research universities, land grant universities, or liberal arts colleges, all institutions of higher education are natural partners with an effort to obtain more data, more information that can be utilized to address some of the very critical issues facing the world today. Because our students are absolutely committed – their part of that zero hunger generation that says—we know too much, we have too strong of a moral commitment to not address these issues straight on. And we

will do it from the diverse disciplines that a university brings to bear on these issues. So the open data access and the open data initiative is a natural partner with the universities, because we contextualize this information, we utilize it across all of our disciplines, working with students and faculty to address the critical issues around the world.

So we're committed to moving forward. We're excited about it, and we commend the efforts that Secretary Vilsack has made; as he indicated, it is a big deal. Universities are committed to moving forward with this and becoming not only a… we are a repository of generating new information, creating new knowledge, archiving it, and making it available to deal with these very critical issues we face.

Howard So with the intros out of the way, so to speak, now let's get to the dialogue of it. I encourage all of you to ask questions of each other. If you see follow-up opportunities, so follow up right there. One of the areas you see challenges around sometimes and knowledge sharing in universities is access to research. And, of course, there's a lot of open movements in this world right now—open innovation, open data, open source, open government, something you know quite a bit about. Where are you in terms of open access to the research, and more to the point, the data from a lot of the experiments that are ongoing. Many times universities in commercial relationships or labs, they don't release that data, even though it could be of, obviously, immense use to many other places.

Deaton Our university, and I think I speak for most major research universities in this country, are very committed to utilizing the knowledge they generate in research to serve society. There are then in areas where the private sector may be deeply involved in some research, that there is access early by industries who may have patent obligations or restrictions that enable them to take advantage of the knowledge being generated. But those are usually very short term and in no way impede the flow of information into commercialization efforts.

And our students are again a great resource here for ensuring that that data gets out. Not only are we educating a generation of students that are the most idealistic, committed and capable of reforming the private sector, our government entities and our universities throughout, they're going to do that. We're going to see more World Food Prize winners come out of the generation that we see sitting in front of us here. And that group is committed to utilizing this knowledge in new and creative ways. And the significance of the open access is that we can compile data from the variety of experiments and experiences going on worldwide in new and innovative ways that is not available now. There is too much data that is sitting somewhere on a shelf not being utilized effectively. And as a university, we're totally committed to making all this information available in every way possible, even to… excuse me.

Vilsack I just realized we're having a discussion about data and technology, and I'm here with a 3x5 card, and you've got an iPhone over there. So there's a definitely issue here.

Deaton [inaudible]

Vilsack Yeah, exactly. But to the doctor's point, we are very committed at USDA to opening up the books on the publicly financed research, and it makes sense if you think about it—the public has paid for this, and it ought to be not just available but easily, more easily available. And so the folks at Cathie's shop are working on ways in which we can create access so that you can easily search for information, find out what we have on file, and access it. We think that that will accelerate, as Gavin indicated, it will accelerate innovation. And I think it will also create opportunities for some very interesting applications that people are coming up with to use the data to better inform producers about weather forecasting, to better inform consumers about safety or nutrition information, which becomes extremely important as well.

Howard Are you putting some brass tacks in there in terms of your procurement, saying that anything that you do with this data has to be then released back to the public or putting it in there in terms of—well, if you're going to finance the research of the grants, you have to release them?

Vilsack Well, in terms of the future, it's our expectation and belief that certainly our Agricultural Research Service information needs to be readily available, and we will continue to work with our grantees under the National Institute of Food and Agriculture to make as much information available as possible, as quickly as possible, and easily accessible. And again we're quite committed to this, so we can't very well encourage other nations to open up their vaults if we don't open up ours.

Howard Gavin, where do you stand on this from your perspective? How are universities and governments doing at opening up their research and data?

Starks We're getting there, but there's a huge distance to go, and I think the point there about making the data not only accessible but usable is really important. One of the reasons we created a new standard called an "Open Data Certificate," which is a free open-source tool, to enable people to publish better-quality open data, to make it discoverable, make it mission readable. So those are the kinds of tools and techniques that we're developing in collaboration with a lot of other organizations around the world.

And one point is—there's so many different potential uses here for open data. The more accessible you make it, you not only reveal better efficiencies inside an organization, even if you're just sharing inside the one organization, you will see improvements. It's not just efficiencies then within that particular sector, the potential for innovation, it's then the additional linked data that we can bring together around other aspects, whether that's weather information, whether it's biomes, whether it's built environments, whether it's population dynasties. The more we make available coming from public sector and from universities and from the private sector… And this is one of the big shifts we've seen over the last, I'd say, nine to twelve months. We've had very large companies come to us and say—What happens if they make their data openly licensed? What's the business model that they have to use? How can they transition? What's the behavior change that happens in the organization? So there are really interesting commercial models emerging here. And one of the opportunities that we see is by opening up information for

anyone to use. We're seeing new startups creating new types of innovation, new types of jobs, that then interface with the existing industry can move much more quickly to try and address specific issues than some of the larger countries.

And there's a really interesting dynamic emerging there, and I think that's something to really explore as we go forward, is how do we engage with public sector, private sector and the entrepreneurs in this space, whether they're social entrepreneurs or economic entrepreneurs.

Vilsack Yeah, to a point to add. I was in California at a poultry processing facility that is adopting new food safety approaches. And they have spent a lot of money, and they have done research and data to suggest that their salmonella rates are substantially lower than the industry standard and even lower than what government has set as a performance standard. What struck me as interesting, and it's to Gavin's point, they voluntarily provided that information, their approach, to the industry, to their competitors. And I asked, "Why did you do that?" And they said, "The reality is, food safety impacts the market, and if our competitors have a food safety problem, it's going to impact not just their product, it's going to impact all the industry's product."

And I think the other thing that's occurring is, through social media there is the opportunity for the marketplace to demand of companies a different standard and a different approach. And I think there's a democratization of this process and of the market, which is, you know, it's troublesome; because it's a new way of thinking, it's a new way of doing things, it's a little scary if you think about it. But it's also, I think, liberating. And if it's done right and done well, it should result in a significant increase in the level of innovation, which is going to be absolutely essentially required if we're going to meet the food security needs of the future. We've got the increased productivity; we have to reduce food waste by large measures in order be able to meet the food needs, the global demand. So I don't think we have a choice here. I think it's pretty much an imperative.

Deaton PUSH as a formal, signed partner with the Open Data Initiative, feels that with more and more universities being engaged in this and opening up the research that's being gathered at universities around the world… Of all the undergraduate teaching outreach that is going on and the international work and the research work in all these fields, we can gain access to that in a way that we never could in days gone by. And you have a session, like we've had so many of here at this event, the World Food Prize event, and you hear economists talking about neuroscience, and you hear nutritionists, of course, talking about economics, you get across the field, social science, natural sciences, physical sciences, interacting in a way that engenders multidisciplinary work, interdisciplinary work, transdisciplinary work—all the ways in which knowledge comes together and works in new ways. That can now be directed by a faculty member and a group of students in a way that is generating knowledge at an unparalleled rate. And you see this in so many ways. You see it being shared through social media.

I was on the ground at Morogoro at Sakoine University in Tanzania recently, and the data in the field, looking at tomato mulching, was being transmitted back to a laboratory at Penn State University in real time, analysis coming back, even as we're walking around the field, trying to determine—do we have something here that can be scaled to a national level? And in this case there was a private sector group with us that was going to take on that task if the results came out the way we felt they may come out. And that was the experiment that was underway.

The point is that we are armed now to do things we never thought we could do before.

Howard Right, I think that's actually a good place to jump off of. One of the things that we've seen happen is that democratization of data itself but also the capacity to analyze it. If you talk to some of the folks who do, say, open source intelligence back in Washington and other kind of strategy folks, you can see extraordinary things happening in real time around the world, whether it's conflicts or it's weather or it's transit, you can see the flights moving back and forth. Any time there's a storm, you see people sharing data about where they are, what they're seeing, etc. But it also creates some real shifts in terms of what we think of as the norms, with everyone having the capacity to report. And then that becomes potentially data. It could be very useful in the agricultural sense. But it can also get into some uncomfortable places, too.

What do you two see as…, and actually I'll open this to you, too, Gavin, as the limits of openness in this space? What about some of the privacy risks people bring up? How are you all thinking about that?

Vilsack Well, let me begin. You know, the discussion we're currently having about drones and the impact that they could potentially have about accumulating information about land, about the characteristics of soil and characteristics of crop production are exciting, absolutely exciting. The opportunity to be more precise with our inputs will make us far more productive. But there is that risk of information that is very specific to your land being made available for other purposes that could potentially create liability or responsibility.

So there is a reluctance on the part of farmers to say, yeah, we like to know the information, but we want to know whose information it is. Is it the landowners' information, is it the drone company's information, is it the GPS in my combine that was produced by a farm implement? Who owns this information, because I want to make sure that it's used for the right purpose. I want to make sure that it's aggregated in a way that's instructive and informative, but I don't necessarily like the idea that it could potentially be personalized and used to be judgmental or to enforce regulations and that type of thing. So it's problematic in that respect.

However, what we need to do is allay those fears. We need to come up with structures and systems that reassure people that information will be privately protected as appropriate but that the data itself can be aggregated in a way that

protects that privacy but also provides the opportunity for understanding more precision in agriculture and become more productive.

So I think there is a discussion that needs to take place, and I think policymakers are having that conversation; but, you know, frankly it's a difficult conversation to have because we've never had it before. So sometimes we don't even know what questions you're supposed to ask. So I think it's a conversation that evolves, and this dialogue we're having here today, we're going to solicit at the end of this input and information and ideas from everyone who's here and everyone who's watching this to participate in this conversation, and from that I suspect we'll find a few of the answers and maybe more importantly the questions we should be asking.

Deaton From a university perspective, and PUSH has discussed this to some degree, there's clearly a concern about personal information that will always be there. We do not have all the protocols and processes worked out for every aspect of using open data, certainly; but the role a university can play so well is that it can contextualize and it can utilize experts in various fields to come together and develop ways of using data that makes it more meaningful and useful. I mean, open data is a powerful tool for us, but it is not the final answer to these very difficult issues of feeding nine billion people by 2050 and alleviating the severe hunger in the world of over 800 million people today. Those are the issues that our students particularly are focused on doing something about and alleviating hunger, that type of hunger, by 2030. So it's the fact that we're now armed with a tool.

I alluded to intellectual property right protection earlier. That's always going to be there in the kind of economy we're working globally. Open data does nothing but strengthen our ability to be more open. In no way does it restrict us anymore.

Starks These are huge questions and fascinating ones. So earlier this year we defined what we've called the datum spectrum to talk about data, whether it's closed or shared or open. And part of that is to then define that your personal data is closed by default and not open by default. And what that means to you, if you think about it—billions of people connected to the Web, tens of billions of devices connected to the Web—is at what point do we need different kind of social contracts between the citizen and the state, citizen and company, company and the state, about how we're going to manage this. Because it may very well be the case that a particular sector, medical research, for example, is extremely well at thought out and detailed rules about who can use what information, when and so on, but can that information be gleaned through other sources?

And I think when we look at the huge deluge of data that's coming through to license, where it's a drone or a smartphone, there's going to be lots of really difficult questions here. And we need to think about the data ethics in every conversation we're having. When you think about the transfer of liability if you're using one set of data for a particular purpose against another. And these are really intricate and detailed questions of why we need to really bring together the main experts from across these different fields, to say, well, what can we learn from the health environments as applied to agriculture? And what can we learn from city

infrastructure when we think about our global data infrastructure? And this is one of the big questions that we see coming, is, what is our global data infrastructure, and who owns it? When you think about GPS information, it's fairly, I think, quite clear to work through, but who owns and who should have if you like, the master URLs for all the biomes in the world or for all of the cattle in the world? And it's a very curious conversation to open up.

Howard Well, the idea is to offer a couple of provocative ideas, and hopefully I can get a couple of answers from you two on this one. I think the current conversation around the country that folks in the Trans-Pacific Partnership is focusing on agriculture to some extent, aquaculture. These are difficult trade issues.

But copyright also plays in to this, too. And of course you go back to the original definition of open data, it's something that's free of licensing, free to use. People who are involved in the agricultural sector know, though, that sometimes we get into copyright questions about seeds. You even get into the question of people trying to copyright genes that they have discovered. How open should those kinds of discoveries be to humanity, particularly when we're talking about data from, say, clinical trials of new kinds of organisms, if you think about what's happening in the next ten years, the efficacy of different programs, different approaches? Obviously, corporations have an interest in trying to constrain some of that. But if we're talking about openness, where should that balance be?

Vilsack That's a question that was posed not long ago. Three or four years ago we had a meeting in Ames about anti-trust, and one of the questions was—What about the protections that we currently have with seeds? What happens when they expire? And we really didn't have in place a mechanism for allowing the seed that had been patented to be made available to small businesses and entrepreneurs and innovators at the expiration of the patent. There really wasn't a process. So as a result of that meeting, we urged the industry, the seed industry, to think about that process and to come up with a way in which information could be made available that would recognize the end of a patent and provide opportunities.

What's interesting about this is it becomes further complicated because oftentimes those technologies are also licensed or regulated by different countries in different ways. And companies would have gone through the process of getting the regulation satisfied for their product—was that also transferrable? In other words, if you have permission to use the seed in Country A, would Country A recognize a new company using the seed technology? And the seed industry came up with a process that is now going to make that information available to entrepreneurs and innovators and at the same time recognize the financial commitment that seed companies had made to develop these new technologies. So I think that conversation is evolving, and I think we're heading in the right direction of a good balance between protecting and recognizing the financial contribution that results in the new technology but at a reasonable period of time making sure that technology is more openly available so that innovators can improve it and enhance it.

Howard Now, do you two want to speak to this?

Deaton I'd say a word, and I would certainly defer to Secretary Vilsack on his experience and knowledge in this area. Let me just say generally that I think universities are big believers in that sifting and winnowing process to try to find truth. And that's easy to say and can be extremely difficult to implement in the kind of restrictions and regulated world that we live in, including significant trade barriers and different historical, cultural and legal experiences of each of the countries involved.

So I think these are very tough questions, but questions that we're going to continue to be addressing in a much more open and transparent manner. And I think we have to appeal to issues of fairness, to issues of social justice, and then of course the issues of basic business principles certainly have to be there, as well as national interests. But in doing that, I'm convinced that we will find new and innovative ways to alleviate the most severe problems in the world and particularly getting rid of extreme poverty in the world by 2030, a goal that our students, you know, the zero hunger generation, has committed itself to. And that's a permeating kind of thought throughout higher education today and one that I think is empowering a whole generation to do something innovative. So you get entrepreneurship, you get new and innovative ways of trying to tackle some of the tough technological issues that are very inspiring. And all that's going to challenge that framework that we're now operating in.

Vilsack And trade agreements are a vehicle through which those kinds of conversations and agreements can be developed. Certainly in the Trans-Pacific Partnership there is a very lengthy discussion, in biologics, for example, because there were different views about protections and length of time. And certainly with agriculture there was a commitment on the part of TPP nations to really focus on a more science-based, rules-based system as opposed to factoring other factors into developing barriers to trade. We want to reduce those barriers. We want to reduce the friction in the trade between nations.

Starks I'd just amplify on that last point that reducing friction in our fiscal economy is a fundamental benefit of open data. And again, if you think about the development of the Web, itself over the last 26 years. One of the big catalysts was actually intranets, of technologists realizing actually this system which had been built on open standards and open principles was a better information architecture than the thing that we had. And gradually the firewall has moved further away. And now when we look at the evolution in these areas for me, it's a bit like the mid-nineties, late nineties web. It's all very exciting.

We have these massive questions ahead of us, and we have these massive opportunities; but ultimately, if we can figure out how to reduce the friction in this economy, reduce the friction in our data transactions, we'll not only be able to solve these individual problems, we significantly address these very specific problems; but we'll have a very different systems view. And I think it's a really fascinating point when you start to bring together what we call social machines, bring devices plus the humans plus our artificial intelligence together. There's going to be some incredible

innovation here. And the business models are coming around that, and it's the new economy.

Vilsack Can I add to a point on this? I think there's another opportunity here to redefine the whole concept of regulation based on data. In the past, governments would come in and say to an industry—This is a practice we want you to do, and here's what you have to do to meet the regulation. And companies and industries have a tendency to sort of repel from that kind of approach, and it creates a conflict.

With social media, with open data, with available information, we now can actually establish standards of performance. And the world can basically know whether standards are being met or not being met, and the marketplace can then decide whether to support those who meet the standards or those who don't. and the reality is, we're seeing this in the food area. In particular, social media is making a fundamental difference in terms of what restaurant chains, for example, are going to feed us and how they're going to feed us and how they're going to be supplied.

Deaton One of my favorite open data examples is the live standard, which is a way of taking inspection data from cities and integrating other places, most notably, Yelp. So if you go to a Yelp page, you can see right there what the inspection scores are. The challenge is always data quality, something I think Gavin spoke to a little bit.

And there's a story recently in the news, which makes me worry a little bit about this in this context. Obviously, people here probably heard that VW cheated on its emissions, right? Yeah, so that introduced a lot of pollution, and they're being held accountable for it now. I think it was discovered at a testing lab at the University of West Virginia, I believe, and then the EPA is holding to account for it.

The question, though, when we look at these kinds of issues—How do you know that the data is good enough to make decisions on? You say, here's the benchmark for where you should be with your emissions, but we're going to check that.

Agriculture, we could say—here's the benchmark you need to meet in terms of lowering your runoff, something that's a pretty big issue where I'm from. I had blue crabs last night for dinner in the Maryland area. Chesapeake Bay has got a lot of dead area in it because of agricultural runoff further up the way. How do you reduce the amount of waste flowing in there and then measure it in an accurate way to be able to hold organizations to account?

Vilsack Well, I think government's got a role. Certainly in the conservation space we are refining our capacity to measure the impact and effect of conservation practices so that we can encourage and utilize conservation practices more effectively to reduce runoff. I would be remiss if I didn't suggest that there were not just agricultural causes to the bay condition, and in fact it's improving because we've seen agriculture basically embrace conservation practices in a number of states in the bay area.

So I think there are ways in which government can help standardize, can help define how success is measured, how performance standards are to be met. And then I

think basically there's going to be audit processes from time to time to check and make sure that folks are doing what they should do, but I don't think that's an insurmountable problem.

Deaton Isn't it true, too, though, that social media itself becomes a corrective mechanism that feeds into the market, and so as you emphasized that a moment ago, Secretary Vilsack, the market has corrective tendencies based on that information. There is also a growing visibility of voluntary standards being imposed, even internationally, among various climate change groups and firms, major firms in our own country, Ford Motor Company and others who have established their own standards for internally operating their enterprises, as well as then the international YSO type standards that really are voluntary to a great extent. And I don't know that government is that directly involved in them, yet they're commanding in terms of the ability of those firms to function internationally. So I'm interested in that.

Vilsack And the more open the information is, the more available it is to be evaluated and/or criticized if it's wrong or if it's inaccurate or if it's not honest.

Howard You want to speak to that, Gavin?

Starks Yeah, certainly. We hear all the time, whether it's from public sector or private sector, that they can't open their data because it's not good enough policy yet. And our usual response is—Well, if you open it, it'll get better policy pretty quickly. And I think this is a really important principle, is by opening up the information, you are putting it in the hands of voters, and you're putting it in the hands of competitors; you're putting it in the hands of everybody who can draw conclusions from that information.

So the prominence of the information is critical, and the ability to maintain and update the information is critical. And I think linked with this… In the UK, for example, we've got a mandate that all public sector data is open by default, so an open government license. And even the U.S. is the same principle on all federal data.

The other thing we've changed is the procurement rules. So if you're producing known personal data, no national securities—put that in the closed bracket—but if you're producing data that could be open, it should be. And that gets written into some of the procurement rules.

So I think there's some really important interventions here. Right away through the supply chain from procurements and policy to research to creating new businesses. And it really does touch on every part of our infrastructure.

Howard So I've got a very specific question from Twitter—go figure. A fellow named Bill Morris says, "Please ask if we can improve on NAIP. Weekly higher resolution imagery already exists—see planet labs—and would serve data-driven agriculture." Do you know what NAIP is, or do you want me to define it for the crowd here?

Vilsack I think you better.

Howard That is the National Agricultural Imagery Program. It's a three-year schedule. It's flown by state. It's got one-meter resolution. It's in the public domain. And they want you to better. What's up?

Vilsack Well, we would be happy to do better, but it requires resources to do this. And one of the challenges that we face right now with sequester and budget caps and difficulties is that the USDA budget that I'm working with is less than it was when I became secretary. And so obviously you've got to make decisions. And 50% of my operating budget is spent on fire suppression, on women, infant, children nutrition programs, on rental assistance for poor families in rural areas and on food safety. And as sequester basically requires us to reduce by a certain amount, budget caps require us to reduce by a certain amount, and 50% of my budget is going out, what do you think happens to the other 50%? And that's really a challenge. And I think at some point in time I think we have to recognize the deficit has been cut by two thirds. Maybe now is the time to begin thinking about really whether or not we need to invest more resources in infrastructure. And I would say this is part of the infrastructure debate, in conversation. And we seem to be stuck on this short-term. We really have to invest long term, and that requires us to provide resources and direct resources into infrastructure.

Howard So you come out to Iowa and you're talking a little bit of politics all of a sudden. It seems like that's happening a lot out here these days.

Vilsack You know, budgets are political decisions; there's no question about that. And it is also the relative importance we place in this country on agriculture versus other priority issues. And it's, I think, too easy for us to take agriculture for granted and assume that we can reduce it because our farmers are so good and there's lots of crops being produced and so forth, but there needs to be an understanding that we have to be even better than we are today if we're going to help the globe meet the needs of a growing world population and to do it in a very, very difficult climate with changing weather patterns, more intense weather patterns, pests, diseases, etc.

Howard You just hit upon something really important—changing climate. Most of the time, people who work the land are pretty aware of what's happening with the climate, so they can tell you things about what's happening—different rainfalls, more extreme weather, when their planting times are happening, maybe how different parasites are moving in or out—because they're really there for that.

There are people, though, who look at climate data, a large amount of people, in fact, and say we don't believe what's there. You can show lots of people so much open data, maybe about the climate, maybe about agriculture, maybe about all kinds of things. But even though you're trying to establish commonality of facts—something I think Senator Moynihan once talked about—there's still a divergence in terms of what to do about it or a basic denial that what's described in there exists at all. So how do we get past that issue, which is fundamentally about humans, when we're talking about open data?

Vilsack Let me weigh in on this. I think first of all, it's to listen carefully to the people who have concerns and then to be able to adjust your message to meet those concerns. So I'll give you an example.

If you go to some of the farmers in the Midwest and you start talking about climate change, their immediate reaction may be to respond to what they perceive to be a political term. And that might be the end of the conversation. But if you talk about weather variability, that's something farmers would love to talk to you about. So adopt the language so that you can have the conversation. Don't necessarily force people into a political discussion. Listen to them, adopt the language that allows them to be open to the message, and now we have climate hubs that USDA is funding, information that we're providing about the vulnerability of particular regions of the country in terms of what's grown, what's raised, the forest issues as well. Now we're coming up with a series of mechanisms and technologies and techniques to try to respond to that changing climate, and we're seeing great receptivity on the part of farmers and producers to that information. So I think sometimes it is how you communicate and whether or not you're willing to adjust it just a bit to the audience that you're speaking to.

Howard Gavin? [inaudible]

Starks Yeah, no, but I think the climate change issue is a great example. I think if we'd been more open with the data earlier, we'd have avoided a lot of the arguments, actually. And we're never going to get rid of all of the arguments, because humans are humans, and politicians are politicians; so those arguments will continue. But it's difficult to argue that not having access to more information is going to lead to better decisions. And, given this scale of the decisions that we're making today around the number of people we need to feed, house, transport, educate, provide healthcare for, etc., I think it's very hard to think about making any formal sensical decisions without more data. And especially now again, as we're instruments in the world, quite literally instruments in the world, even if our virtual systems don't want us to do it, even if companies want to lock things down, and there's a huge citizen's science movement here, which is going to actually push more information out as well.

And so the opportunities to say is how do we bring all of these people together and bring together massive citizen's science projects, the collective brainpower of our universities, our industries and our political will to really nail some of these problems, because they are solvable. I'd rather change the conversation to—what's the solution?—rather than, is there a problem?

Howard [inaudible]

Deaton I just wanted to emphasize that I agree with what Secretary Vilsack said, that the role of universities and science and knowledge generation is not to undertake the political dialogue but to arm it with keen analytics and data from diverse sources that we can actually address issues such as climate variability. I mean, you only have to look at the drought in California or issues like that in the world where clearly

there's the knowledge that comes from analyzing that variability is of great value. I think this is one of the virtues of an open data kind of system.

And I could give dozens of examples like that, that we wouldn't know about a lot of the issues from a lot of the standard data that we look at, but with new and innovative research going on, particularly, for example, the gender gap, which has been discussed a lot here, we know that, if women in the world, estimates have shown, could have access to land titles and inputs and training that is out there, we could alleviate a hundred to a hundred and forty million families in poverty. Those are powerful issues that will increasingly, we will be armed to deal with, once we have access to greater data by more people analyzing that and bringing it to groups like this.

Vilsack One of the data points on this issue of hunger is this issue of food waste. You know, 30% of the food that's produced in the world is not used the way it was intended to be used. When you know that data point, it is almost a moral responsibility to respond to it. So we have at USDA created a partnership with EPA and over 4,000 organizations to reduce food waste in the U.S. by one half over the next 15 to 20 years, in an effort trying to reducing food waste domestically and then working with the Feed the Future initiative to reduce it internationally.

Howard Trying to put a little less food on my healthy plate and make sure it's clean. Okay. I know you wanted to share something about a challenge. Is that right? Okay. I want to make sure we get that in.

Vilsack Make sure we get that in. Look, we've had this great conversation this afternoon. We want it to continue. And first and foremost, we want the folks who are here today, the folks who are watching us, folks who will hear about it, to be part of this effort of this Global Open Data for Agriculture and Nutrition.

So we're announcing the summit that will take place in September of 2016. We expect and anticipate that this summit will be a multi-continent summit. We will have virtual presence as well, an opportunity for people to participate. But in order to make sure that this conference and this summit is as effective as it possibly can be, focused on reducing hunger and doing it in a sustainable way, we need your ideas and we need your thoughts. And so on your seats, the information that was referred to earlier, gives you the opportunity to weigh in with your ideas and your thoughts about how open data can be more effectively used. How should we use it? What questions should we be asking? What should we be exploring? We want the input from folks who are participating here at the World Food Prize as well as those outside who are watching this to participate with us. So there's information in terms of how you might be able to provide information, your thoughts, your ideas. And the people with the best thoughts and ideas will be our guests at the summit in 2016, in September of 2016.

Howard Okay. Thank you for putting that out there. So we've got some questions coming in from Twitter, and I told you I'd get more of them in, so make sure I do.

Aaron Hammond asks—How can young ag students use open data in our education and career development? I think that's a question for you.

Deaton Well, that's exactly what, I think, PUSH is trying to do, too, as a partner to this effort; because our universities, our faculty, our students at all levels can utilize this data. We can access it. Students have enormous access through the Web, Internet, and social media today, that they're often way ahead of their professors. But also our faculty and our research institutions bring that data to bear in new ways on the problems they're utilizing in teaching and in research and extension and in student engagement. And now we have really innovative new ideas coming forward as a result of students working with this data.

So I would say, talk to faculty and leadership at the college and universities that you're engaged in. And students can be the greatest mover in moving this forward.

Vilsack Take advantage of internships at USDA to access information as well and utilize the data that we can make available.

Howard And I'd also point Aaron to GODAN.info. There's a bunch of case studies right here for how open data has been put to use. You know that you cannot eat data, but if you put it to use, maybe other people can eat more or eat better.

So here's a different kind of question, another one that came in. One of the, I think, signal acquisitions in this space was something called Climate Corporation. Climate Corporation got a ton of open data from the U.S. Government, and Monsanto acquire them. Now, they've gotten data on, well, soil readings over time, ended up putting them to use in trying to understand how to better use all the things that they make.

What progress has the USDA made towards releasing that data in an open, usable form so the public can get use out of it and not just a huge multinational?

Vilsack We're creating the platform to make information available. That's part of our commitment on open data that we made last year, and it's a commitment that we're very serious about. So we're investing in creating the process, the library, if you will, by which this information will be readable and accessible.

Secondly, I think we are continuing to promote this concept of precision agriculture in a lot of the research that we fund and a lot of the information that we're providing. Our belief is that the more precise we become with inputs, the better it's not just going to be for the farmer and his bottom line or her bottom line, it's not only going to increase productivity but it's also going to be more sustainable and more helpful in terms of our efforts to try to make sure our soil is as healthy as possible and water as clean as possible. Precision agriculture, I think, is going to be an important component of the future, so this is something we're very committed to.

Howard But to follow up, we've had DATA.gov now for five years, so there is a place to put this, better than it used to be. There's a hundred thousand datasets on it, something

like that. Why not go back and see what Climate Corporation got from you all, clean it up or work with universities to clean it up and put it online?

Vilsack You could do that, but you can also spend a limited period of time and limited staff—see budget discussion of a few minutes ago—on making sure that more information is available. You know, I'm a little bit concerned about the focus on one company and one company's practices here. I think the key here is for us to suggest that we are very much open to creating an avenue for information to be utilized. And if it's utilized by some for innovative purposes, that's the whole purpose behind it. And obviously the folks at Monsanto believed that they could be helpful to their customers and their producers and agriculture generally. And I'm sure that there's going to be a series of other kinds of opportunities that are being created based on what we are putting on the Web, and we're putting more on the Web every single day.

Howard I bring these things up because people who are in the agricultural community have talked to me about them, right. And there's no way to not talk about the significant interests that are out there that may want some things to remain closed. As you know, in DC there is a huge industry, and business intelligence is all about understanding what's happening behind the scenes and then doing information aribtrage. You talked about having a device here versus not there—that's actually a great example of the difference open data can make. If someone can get access to weather, to commodity prices through their phones, it can transform what they're able to do. If, however, someone who's buying a commodity knows what the price is and someone doesn't, then that changes.

Vilsack Well, and we are confronted with that in terms of when we actually release studies, the whole access to rapid information has changed the way in which and when we release information on crop reports, for example. If you know it a millisecond before I know it, you could potentially benefit. So we are very much focused on trying to make sure that the disclosure of this information is done on a very fair and level basis.

The other thing, I think, is that—look, this is a process that's evolving. Technology is always ahead of the questions, the ethics, the problems, the challenges. And so we just have to be vigilant. As these things crop up, we have to be serious about responding to them. But I think it's a little bit difficult to be ahead of the pace of technology, because it is increasing so rapidly, and I think we've mentioned several data points today to underscore how significant that progression has been and continues to be.

Howard One of the things I happen to like about being born in the U.S.—I feel very fortunate in that sense—is we have some laws on the books which give us protections other countries don't. One of the most important aspects of the Affordable Care Act, Obamacare, is the protection against being denied coverage for preexisting conditions. That may actually be the most important part of that law if genetic testing becomes a big part of the way that we go forward and you'll know what someone is likely to have. Other countries that don't have that, that kind of testing

can become problematic. We also have a Fourth Amendment, which means you're not supposed to search things without a warrant, something that the Supreme Court supported for these devices recently. So I tend to come at this from the perspective of—start with the principles and what we already have on the books, and then apply it to the tech. Other parts of the government, maybe move around that sometimes. And we're having debates about those things, too.

Gavin, there is a question for you that came from Brannon Hanson. Can you expand on the primary differences between open, shared and closed data and how to make that determination? You've got a minute.

Starks Well, hopefully I can find everyone a resource we've created called the data spectrum, which is a single slice. And really closed data is something like internal access, so it could be a sales report. And shared data could be medical research where you require identified. And open data could be something that's completely openly licensed, like a bus timetable. How's that?

Howard Pretty good. That's pretty good. I think he's thought about this a bit before. So we're in fact… we've gotten to 4:15 just like that. It always happens with these panels, and I could keep asking you all the questions for some time to come. Hopefully, you'll join us on Twitter at some point. Secretary, we can ask you some questions.

Vilsack My only problem with Twitter is 140, that whole thing, you know, dealing with very complex issues. I'm more inclined to want to be more expansive.

Howard All right, you can drop into a Google Hangout, and we'll tweet questions at you.

Vilsack There you go.

Howard And you're already there. Gavin, thank you so much. It's good to see you again. Thank you all for your questions.