

Carrie Stokes: We are living in a data revolution. My name is Carrie Stokes and I am the Chief Geographer and the Director of the USAID GeoCenter here at USAID. This data revolution is affecting, not just the work we do at AID, but all of our lives every day. The data revolution includes geospatial data, it includes geospatial technology and that is the focus of our session today.

[00:01:00] We are going to discuss how this revolution is having an impact on age-old international development challenges. What is geospatial data and technology? Geospatial data simply put is data that has a location associated with it. Historically, you would begin to think of geospatial data as something on a map, a paper map that we've been using for hundreds of years to figure out how to get to where we need to go.

[00:01:30] In today's world, this data revolution is also digital. We have more digital information coming at us than ever before in the history of human civilization.

[00:02:00] Geospatial data is no exception so data that can tell us where the information is based is what we like to use as geographers and you can typically think of a point, a line or a polygon, you're used to seeing these on maps.

[00:02:30] A point might be a building, a line might be a road, a polygon or an area feature, it might be something like a park or a lake. These are terms we use in the world of geography. Geospatial technology is evolving at a very fast phase, just like technology in our world. Geospatial technology includes what you may think of immediately as remote sensing technology with satellites in space.

[00:03:00] It includes a GPS device which would be receiver on the ground to be able to understand what is being triangulated with those satellites. It includes the software that we're using today, geographic information systems software, to be able to process a lot of the data and analyze it at a pace that is unprecedented in human history.

It includes a device that many of us carry with us everywhere we go, the mobile devices can serve also as a piece of geospatial technology. Those paper maps we used to pull out when we're trying to find our way across town or perhaps driving to our Thanksgiving destination or family across the country, now we can't imagine having to drive and look at a piece of paper and try to see where we're going.

[00:03:30] We all probably have Siri or someone talking to us to tell us with our mapping app where to go. That's part of the digital data revolution. This revolution is not just affecting our lives here, it's affecting what we do in international development and trying to address the challenges.

[00:04:00] USAID believes deeply that to transform the development enterprise, we must invest in this geospatial data and technology revolution. One of the ways we had done that, you just saw a trailer or a preview so to speak of some of the things we're going to be discussing about in our panel today. What you saw was a mapathon there at the very end. We are investing in a program that brings capacity

to young people all over the world.

[00:04:30] We have 4,000 students in 75 universities in 25 countries learning how to map with simple mapping tools, web-based mapping tools, part of this technology revolution. They are creating new geospatial data, they are sharing that data on an open data platform that's web-based. This data creation process is now being opened up to people around the world who've never had access to create their own data and share it with the world.

[00:05:00] That particular program is called The Youth Mappers. We believe at AID that it's extremely important to invest in the next generation as they become familiar with how to solve their own issues locally using technology in ways that was never available to them in the past. USAID and the lab here at USAID have invested quite a bit in geospatial technology for development.

[00:05:30] In the last 10 years, we have invested millions and millions of dollars in different types of programs both internally to be able to take advantage of geospatial technology and how we do business as an agency and also with our partners who are conducting the development work in the field and in the countries and the communities where USAID works.

[00:06:00] Today, we have a panel of experts and they are going to be talking to you about some of those investments, about their particular work and how it relates to the objectives of ending extreme poverty. I would like to start by introducing our esteemed panel. To your right is Jenny Frankel-Reed. We did have a chance to see her in the video that we showed you here which she'll be talking about today.

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Jenny Frankel-R: My work is done.

Carrie Stokes: Jenny works with USAID. She is based in our Climate Change Office and she leads the program, SERVIR in a joint venture between USAID and NASA. To Jenny's right is Laura Hughes. Laura is a data scientist. She's based also here within the walls of USAID. She works in the lab in the GeoCenter and she will be talking to you today about some of her work. To Laura's right is Rachel Trichler and she is an implementing partner of the lab. She's part of our Higher Education Solutions Network and she works for the program called AidData and is based in Williamsburg, Virginia. To Rachel's right is Chris ... Help me, I'm so sorry.

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Chris B: Bessenecker.

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Carrie Stokes: Bessenecker. Okay, I have been reading about some of Chris's work, he had just flown in from abroad. He is based in California and he got his start in international development as a Peace Corps volunteer in the country of Honduras. Each of these experts brings a wealth of experience and knowledge about how geospatial

[00:08:00] technology is relevant to international development and we are going to start with some questions for each of our panelists. We will start with Jenny. If you could

please tell us how does geospatial technology relate to your work.

Jenny Frankel-R: Great. Well, thank you and I'm so glad that we got a preview of the program that I manage so I can focus on other things. In the Bureau for Economic Growth, Education, and Environment, we manage the SERVIR program which is actually a program that Carrie Stokes started more than a decade ago, actually, before Google Earth was a tool that we all know and love today. At the time, the questions then were wow, we can see a lot from space and how we can use that for all kinds of biodiversity questions and other kinds of challenges.

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[00:09:00] The questions have changed so much and the capabilities have changed so much. SERVIR is a partnership between USAID and NASA and the focus is really on helping developing countries and regional organizations that are technical institutions with regional political mandate to build capacity within those regions to use these kinds of technologies. Really helping people help themselves with these kinds of solutions in Africa, Asia and Latin America.

[00:09:30] The focus is on four key themes: Food, security and agriculture, water resources and hydrological disasters, land cover, land-use ecosystems and forests and weather and climate issues. Those issues are the ones where the value of this kind of satellite data and geospatial data is very well proven and well known the potential to transfer some of the solutions from NASA researchers, these regional institutions themselves to local decision makers is really positive.

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[00:10:30] This goes without saying, potentially, but we've seen it over and over again but why this data is so valuable? A lot of these issues that I just described related to those sectors require good science and data. We're often trying to help countries deal with them in places where their observations are missing, where they've had conflicts, that have reduced the ability to gather data or they're just remote, hard to access regions.

[00:11:00] Working on data dependent issues requires us to look for where the data exists and to a large extent, that's looking for satellite data. The best ways to answer some of the questions that these countries have is to bring in this information and combine it with local data. The thing that's exciting about what we're doing is building up the awareness and the demand for this kind of information around the world means that as the technologies change and as what we can do changes, we can bring that in.

[00:11:30] Ground water, for example, is one where we're working with partners in West Africa, the Mercy Corps and a lot of USAID partners on can we use geospatial data and satellite data to answer those questions better. Through the program that we have, we're trying to tap into where that science exists because it's not proven and USGS is doing some interesting research on getting a read on ground water from other measures.

That's the kind of thing that keeps everyone very excited about the possibilities and we keep demonstrating over and over again the value. In South Asia right now, our

[00:12:00] partners are mapping the extent of that flooding that has affected 41 million people across the countries there. That's a capacity that now exists in the South Asia region itself and so the US and the other partners don't have to create those maps and send them over, our partners there can actually answer those questions themselves.

Carrie Stokes: Thank you.

Jenny Frankel-R: Shall I pass it here?

Carrie Stokes: Laura, also, can you tell us about how geospatial technology is related to your work.

[00:12:30]

Laura Hughes: Sure. As Carrie said, I work within the GeoCenter at the USAID and our real core goal is to improve decision making internally within USAID and increase the impact that USAID's program have to end poverty. As part of that, geospatial data and data analysis are really at the core so we're a group of geospatial analysts and data analysts, data scientists who work both internally with USAID missions abroad, as well as missions within DC. Unlike Jenny who's very externally focused, we're really focused on trying to improve USAID within ourselves by providing geospatial and data analysis to improve development and programming.

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[00:13:30] Now, that can be everything from broad strategic planning to looking at how to improve program design and implementation, to monitoring and evaluation about our programming. Our specific role in who we incorporate geospatial technology is really trying to help them understand, first of all, where are we working and then moving beyond that to try and analyze where should we be working. Really looking at by the nexus of both what the current status quo is and the potential for understanding that future. Specifically, the GeoCenter provides three core services to our colleagues within the agency.

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[00:14:00] First, we provide customized analysis and visualization based on questions that missions or other operating units have. They give us a problem and we try to find data and geospatial data that helps us answer them to improve their decision making. Now, as you saw in the MCC video is that, oftentimes, in the developing world, data doesn't exist and so we try to plug that gap by helping collect information about unmapped areas of the world. Then, the last thing is that we recognize that we cannot do this by ourselves. We're a team of probably what? 15 or so people and so that's a small group within the agency.

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[00:14:30] We try to build the capacity of our colleagues and so that includes everything from providing training to help people think about data and geospatial data and how to incorporate that into their work. We also have built a network of GIS and data analysts around the world so in, I think, about 25 different countries, as well as operating units within Washington DC that provides similar services to the ones that we provide within the GeoCenter. Then lastly, we want to institutionalize this as much as possible and so we helped develop policies throughout the agency

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about how to collect and use geospatial data.

[00:15:30] Thinking about, really, what benefit this provides to USAID, I think the two core things are first of all, it allows us to demonstrate to the agency where there are patterns that are intrinsically spatial. As part of that, I think the second core thing is that it allows us to ask questions that hadn't occurred to us in the absence of data. As one particular example of that, we've been working with the mission in Rwanda for the past year or so. They came to us with the question of trying to understand chronic malnutrition across the country. In Rwanda, about 37% of children under the age of five are stunted or chronically malnourished.

[00:16:00] They wanted to understand exactly where these patterns existed and what was driving the chronic malnourishment among children. Rwanda is a very tiny landlocked country within Africa. It's about the size of Maryland and so initially, we are thinking in that small of a place, how much geographic variation actually is there with this intrinsic problem? We analyzed a bunch of household survey data to try and understand it and the result was actually very surprising to us. There are actually strong patterns, geographically, in malnutrition across Rwanda. That's surprising if you think about looking at an area the size of Maryland.

[00:17:00] What's really interesting about this was that about a decade ago, chronic malnourishment was pretty uniform across the country but in the past decade, that has actually changed so the east has improved more rapidly than the west. Really the benefit of these data and these analyses is that it allows us to ask questions about why is that the case. Why is the east fundamentally different than the west? What can we learn about it so that as we improve our programs, we can understand how to take lessons learned from improvements and to translate them to places that are still lagging. Then lastly, how do we use that information to understand whether we should be continuing to invest uniformly across the country. I think the real benefit of all these analyses is that it really focus us around the data and allows us to ask questions that allows to prioritize exactly where we're working and ask the question about whether we are serving the people who are most in need.

Carrie Stokes: Thank you, Laura. Rachel, how would you answer the question?

[00:18:00] Rachel Trichler: Well, if you know anything about Williamsburg, Virginia, it's probably colonial Williamsburg which is this village of re-enactors portraying life in the 1700s, not particularly current. We at AidData are trying to bring Williamsburg reputation through the 18th, 19th and 20th Centuries and into the 21st Century. We really focus on using geospatial data, making that usable in a development context and particularly for the evaluation of development projects.

[00:18:30] We do that in three main ways: The first way is georeferencing or adding location information to identify who is doing what and where within the development context. We, then, use that data to conduct impact evaluations where we merge spatial data on the who, what, where with satellite and survey outcome data to rigorously look at the impact of those programs. The third piece is maintaining a

spatial data repository that makes satellite data accessible and usable to researchers and practitioners.

[00:19:00] Let me give you an example that highlights this, about 12 months ago, we were connected with an economist in USAID-Afghanistan's Office of Agriculture and he was really excited about using geospatial data to do a rigorous evaluation program, especially because of the challenges and the conflict setting of new data collection. He identified six potential projects that were either already closed or soon to close where no evaluation, no rigorous evaluation was planned.

[00:19:30] We selected one that was a canal rehabilitation and improvement project and they were interested in looking at crop productivity so the crop was wheat, in this case, for these small holder farms that were along the canals that were improved. The first challenge was the information on the location of these canals was in PDF maps and so we need to make those machine readable which we did.

[00:20:00] We digitized those at AidData and then with that information on the location and the timing of improvements to each canal, we were able to join that with satellite data, very high resolution satellite data on vegetation, that allowed us to look at wheat productivity in these fields. 12 to 15 months after this conversation, this is still a project that's ongoing but we will be able to have a rigorous evaluation of a project that was already closed by the time we started this conversation about evaluation.

[00:20:30] We'll do it in a conflict setting and with data that already existed, maintained by the mission and using existing satellite data. This example highlights these three pieces I mentioned that AidData is doing to bring geospatial data to bear to answer our questions about the effectiveness of development programs so I'll speak in a little bit more detail about those three components that I highlighted before.

[00:21:00] First is georeferencing or adding location information to, again, identify who is doing what and where. This might be digitizing PDF maps as in the Afghanistan case, it might be sorting through World Bank documents to map project locations or even using media and other online resources to look at locations of Chinese aid. The second component is the evaluation piece so where this data on project locations and the timing of implementation is really granular and really high resolution.

[00:21:30] We can use that to look at effectiveness, causal impact of these programs and apply quasi-experimental methods to the data on locations, adding in satellites or georeference survey data on outcomes and covariates to get a causal estimate of impact. The third piece is we maintain a spatial data repository using funding from USAID's Global Development Lab in the supercomputing cluster at the College of William and Mary.

[00:22:00] We are able to collect and house some nationally georeferenced data sets on aid and a bunch of other satellite data covariates and make that accessible to practitioners and researchers who want that in a CSV spreadsheet format. They

[00:22:30] want to be able to get information on nighttime lights or population or aid allocation in all of the districts in Uganda between 2000 and 2014. They want that to be in a CSV that they can then incorporate in their analysis so we're able to provide that service.

We are really excited about the potential to incorporate this geospatial data into evaluation with all these tools, in addition to work with USAID Afghanistan, we worked with a number of other missions and agencies. USAID West Bank in Gaza, we're looking at a large infrastructure program there, roads improvement and using nighttime lights as a proxy for economic development.

[00:23:00] We've been able to work KFW to look at deforestation in indigenous lands or the World Bank to look at malaria rates. As we all have mentioned, I think this kind of geospatial data continues to become more widely available and as that happens, the opportunities to use that for evaluation in a way that's cheaper and faster than RCTs but can still really provide us with rigorous evidence, those opportunities are only going to continue to grow.

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Carrie Stokes: Thank you, Rachel. Chris, how is geospatial technology and data affecting your work?

Chris B: Great. Well, thank you. I work for an international development organization, a great international development organization called Project Concern International. It's been around since 1961 and we work in a lot of different areas. Health, hunger and hardship is what we call it. We use geospatial data in a lot of different ways but I wanted to tell you about one way that I'm particularly passionate about how we use geospatial data and we're out in the marketplace if you want to come by and see a demo.

[00:24:00] In 2006, I was sent to Ethiopia to respond to an ongoing drought. While driving across this parched landscape, I encountered a pastoralist and his family and their small herd. I was curious to know why he was there because there was nothing there. We stopped and I asked him and what he told me was that they had just traveled 14 days from Somalia to that very location based on word of mouth that there was pasture there only to find the place where his animals would die and his livelihood would soon be lost.

[00:24:30] What was curious was that very morning, I was looking at a FuseNet report and if you're familiar with FuseNet, it uses a lot of different data points to determine where the hotspots are, including satellite data. I felt quite odd, I mean I don't even own a pet turtle and I have free access to this data and this pastoralist who this data would be critical for never saw this data. As we began to explore this issue more, we discovered that this pastoralist was not alone.

[00:25:00] That in fact millions, hundreds of millions of pastoralists across the continent use the same traditional methods for migration decision making: Word of mouth, indigenous knowledge and scouts. While those are great tools, they can never

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cover the expanse of traditional grazing areas in which these pastoralists operate and with climate change, some of these methods are becoming increasingly challenging. What was once reliable is now less reliable.

[00:26:00] We set about trying to figure out if we could provide information, satellite information, in a way that's relevant to those groups of pastoralists. Now, these are some of the most marginal and remote populations on the Earth so there were a few challenges in doing that. Ultimately, what we decided to do is to go to these communities and sit down with them and map their traditional grazing areas.

[00:26:30] That was the foundation of this and I remember reading and researching that pastoralists won't understand topographical maps and we found that that wasn't true. Then we'd take those maps, we digitized them and we overlaid it with a relatively simple tool from a geospatial weather data called NDVI or Normalized Difference Vegetation Index. It's basically a measure photosynthesis. We overlaid that data, update it every 10 days on these maps and we distributed the maps.

[00:27:00] Once every 10 days, about one map for every 120 households and what we discovered was that many of these traditional pastoralists who we often think are resistant to change were hungry for this information. They took that information and they used it to make migration decisions. In fact, we just did our mid-term evaluation where about half a million pastoralists are using these maps and 64% of them made fundamental decisions that were different than when they didn't have the maps.

[00:27:30] Changes in where they migrated and when they migrated and how many animals or even not to migrate because the conditions in the other areas are no better than where they're at so why waste the calories of the animals to move there. In our proof of concept, we found that over 70% of the pastoralists were using these maps, over half found it to be their most important source for migration decision and we found a 50% reduction in herd mortality.

[00:28:00] Now, we've taken it to the next level where we've spent about the last year creating an app. We had a design sprint hosted by Google, we had pastoralists participate in that process to design an app for them, that uses the same satellite technology but we also have added a water layer. Pastoralists will tell you there's two reasons why their animals die: Lack of pasture and lack of water. Now with an app version, because you can zoom in, they can see water down to 10 meters in diameter.

[00:28:30] Not only that, they can leave alerts so you can use georeferencing, because it's a smartphone, to leave an alert to your fellow pastoralists. What are the things that they want to share with their pastoralists? Diseased animals, prohibited grazing, dry water, conflict. We're about ready to launch the app in Kenya, at Tanzania and Ethiopia and we think it's going revolutionized the way pastoralists use satellite

[00:29:00] data and mobile technology to improve their lives.

Carrie Stokes: That's a great story. Just to clarify then, are people receiving this information in the

field based on a map per 100+ households or are they using, now, mobile devices in the field?

Chris B: [00:29:30] Coming soon on a mobile device near you. Right now, they're using the paper maps and as I said, we use a cascaded distribution process with government at the, what's the equivalent of a municipal level, and then a village level and on down. Even though it's one map for every 120 households, one in three households are getting access to these maps and using them.

[00:30:00] The challenge with that is that if a motorcycle breaks down or they ran out of printer ink, that map doesn't get there. It's the access and the frequency of access that we found is contributing to their adoption and ability to make changes.

[00:30:30] It's not just seeing one map in one point in time, it's seeing a sequence of maps and seeing the changes as they take place overtime. It's enabling them to be better pastoralists, it doesn't replace traditional knowledge, it doesn't replace word of mouth, they still incorporate their traditional practices, it's just better information for better decision making.

Carrie Stokes: Great. Well, that's certainly is an example of from space to village. Certainly. Thank you for sharing that story and your motivation for getting into this business of geospatial information. What are some significant impacts for national development, at large, that you would draw from this experience of working with the pastoralists?

[00:31:00] Chris B: Well, what's interesting about this area is that, I made reference to the FuseNet data, what I call the emergency response apparatus, really developed out of the famine of the '80s and a lot of the use of satellite technology in monitoring drought and the events that came. That was the genesis for it. They had one noble objective which was to prevent major famine from happening.

[00:32:00] One of the consequences of that is geospatial technology got directed or channeled into one area and that was use of data by policy makers. Yet, even with that, we know that droughts are slow onset and so even if you use data like that, there's a delayed response and usually the response is you provide pastoralists with food aid.

[00:32:30] That food aid represents only a fraction of what they lost and it doesn't replace what they've lost. I think the potential here is that if we refocus or reorient, not that policy makers don't need this data, they certainly do, but if we could think about ways in which that ground level individual can use data to inform their own decisions and potentially prevent or mitigate those drought-related disasters from happening in the first place.

That's really what we're focused on is how can this information, we know it's valuable to us, but how can we make it digestible and valuable to them. I think there's a great potential especially with this evolution. That's happening, I just got

[00:33:00] back from Ethiopia and a village, where a year ago, there was maybe just some young dude with a smartphone. Now, half the households have smartphones. It's changing fast and it creates some opportunities for us.

Carrie Stokes: Great, thank you. Those were some great ideas and examples of how decisions are being made at a very local level. Jenny, I'd love to hear from some of your  
[00:33:30] experience on how geospatial technology or the observations have affected decisions with the folks that your SERVIR program has been targeting.

Jenny Frankel-R: There's a category of impact that has a really boring name. If anybody has a better name for it, please tell me. We call it Administrative Efficiency Gains which basically means using scarce resources more efficiently and everybody loves it as you would.  
[00:34:00] Basically, we have a bunch of results like that that I'll describe just one or two. In Nepal, the Ministry of Agricultural Development has all of its agricultural statistics down to the village development community level on paper before this project started. That data was transferred into an atlas. What that gives you is the historic  
[00:34:30] data on agricultural production and crop types and all of that for the country at a very fine resolution.

What now has been developed, because drought is a big problem for Nepal, is an agricultural monitoring tool that integrates NDVI data on greenness with temperature and precipitation data and gives an early read. Using past data,  
[00:35:00] bringing in present data and giving a read on future anomalies or changes. Whether there are going to be increases in production likely or decreases in production at a countrywide level at that fine resolution. It allows the ministry, but also the World Food Program and actors who are interested in food emergency situations, to get a much quicker read on where they need to go.

If we know that there are likely anomalies in these places, we're not going to have to send people out based on what happened last year or based on just what the climate is doing this year or maybe trying to hit every place but we can target that  
[00:35:30] work much more efficiently. The World Food Program directed their food aid earlier using this tool which saves also in being more efficient with the assistance that humanitarian actors provide and helps the Ministry of Agriculture manage its data more effectively.

Another one would be in Guatemala, there is a nine-year-old forest fire alert system and we did, recently, an economic evaluation study of that. They kept altering the willingness to pay for different improvements to the system and essentially found no limit of the respondents in the government in terms of their willingness to pay. What I think that reflects is that when this data is integrated into  
[00:36:00] decision processes and decision making systems that people have, they can't imagine working without it. That's one of the real challenges to what we're trying to do.  
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I think one of the measures of success is that allowing the government to figure out how we can help them bring this data in themselves and making sure that it's not a standalone platform, a new website or a new product that we're trying to convince

[00:37:00] them to use. Rather, data that they manage, that they own where this data is coming in and adding some value. A lot of administrative efficiency gains or a better use of scarce resources and really those efforts end up paying for themselves over the long-term even though there were costs to proving it and getting it going.

Carrie Stokes: Great, thank you. Laura, what other examples of how decisions have been made [crosstalk 00:37:24]?

Laura Hughes: [00:37:30] Yeah. I think in taking on Jenny's theme of really investing in fundamentals and how establishing data from the start, good data, is so important. I'm going to give you a specific example of a generic problem that we see across USAID. We had been working with a mission who had a combined health and nutrition project and so is meant to be collaborative and an integrative approach to all sorts of health and nutrition issues.

[00:38:00] The issue was that they had noticed in some of their site visits that certain partners were potentially working in the same place doing the same things. That's a common problem and it really exposes the larger issue that many missions don't have systematic inventories of exactly where their partners are working and what they're doing.

[00:38:30] Oftentimes, the technical teams will know this information but it'll be very piecemeal or it'll be buried in PDF reports and there's not a unified system. That really exposes three major issues: The first is that, obviously, you don't know where you're working and so if you want to know what's happening in province X, then it requires a lot of time and energy to go and track people down and say, "What's that partner doing again? Are they working there?" It's a huge waste of time and energy.

[00:39:00] The second is that potentially exposes duplicative efforts which is what they were really concerned about when they're talking about collaboration between partners. It's not efficiently using resources and it's creating a lot of inefficiencies. Then last is it's potentially limiting the effects that our programs could have.

All these partners were designed to bring their different set of expertise to the problems in health and nutrition but not knowing where they're actually working and what they're doing means that how do you actually start to have a conversation about collaborating. At USAID, we're very big on CLAs so collaborating, learning and adapting and that's wonderful but how do you start to think about how to collaborate with people unless you know exactly where they're working and what they're doing.

[00:39:30] We worked with the mission to establish a system to collect location data from each of these partners so specific to the administrative level three unit about exactly what the partner was doing and what specific interventions that they could do. This has really transformed the way that they're collecting information and I think the real impact of it has been that the mission and the partners themselves

[00:40:00] can start to have these conversations about how to collaborate. By knowing where they're working, they can start to really ask the deep questions about where should we be working and how can we really compliment each other's efforts to create the best benefit for all of it.

Carrie Stokes: Great, thank you. Just a point of clarification, a term that Laura just used, administrative three boundary or admin three. That's a term we use in geography. It's one of those polygons I was mentioning in the beginning. Relevant to what we have in the United States, I'd say it's probably like the county level. It's a very geographic specific place and this is important as we do geographic analysis and we think about place-based development, what is the scale that we're focusing our energy on, where are we trying to invest and what kinds of impacts and where are those people. If we don't know that going in, it's hard for us to really measure and monitor, overtime, whether we're hitting our objectives. Thank you. I've got a question for Rachel, from your experience, what do you feel are the barriers to using geospatial data and technology to tackle development challenges?

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Rachel Trichler: Thanks. I'll speak from the using geospatial data for evaluation perspective and the reason that it is so exciting to be able to use geospatial data for evaluation is because it helps to fill this missing middle. We have performance evaluations that tell us something about the project but not really any evidence about it's causal impact and then, we have RCTs which are baked in from the beginning, can be costly, can require a long period of time to implement.

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Using this existing geospatial data helps to fill the in-between, the missing middle. Being able to generate a new tool to generate evidence, to tackle development challenges that is faster, is cheaper than RCTs and again, uses existing data. You can even follow up on a project five or ten years later if the data exists to look at long-term impacts. The potential there is, really, exciting to expand the evidence base but it's not a great fit for every project and there are caveats and there are limitations.

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I think one of the biggest obstacles that we have encountered in trying to use geospatial data for development evaluation is getting all of the right data in the right place and connecting people who have data on the program with people that have some of the expertise to be able to merge that with other geospatial data and do an evaluation with it. Many development organizations or implementing partners still don't track project locations.

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Even if they track project locations and maintain those records, they may not have a record of the timing of implementation at each of those sites and just a project start date and a project end date doesn't give us enough granular data to be able to really do a rigorous evaluation with.

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Even if you have the locations, if you have the timing of the implementation, it can be challenging to find an access to that data. It's on somebody's computer somewhere who left the project two years ago, I've seen nodding heads, we're all familiar with these challenges of passing on the institutional knowledge.

[00:43:30] Then connecting that information with somebody who can bring other geospatial data to bear is critical and some geospatial data is easy to work with but something like satellite data that you're trying to extract and process raw, satellite data from NASA is not easy to work with. I mentioned this supercomputing cluster that we have at William and Mary and that's necessary in order to work with these huge data files and spit out something that's actually usable in analysis and familiar to a lot of people who do this analysis.

[00:44:00] Making those connections and getting all the data in the right place is challenging and probably the biggest that we find when we're trying to do evaluations. On that note, I will put in a plug, I am here for the rest of the afternoon right by the amphitheater entrance with the purpose of getting into the nitty gritty and trying to make those connections.

[00:44:30] If you have a project that you're working on, that you will be working on, that you already worked on and you want to know, "Is there something I can do with geospatial data to evaluate this?" Please, come talk to me, I want to have those conversations. I'll also just add that there are challenges and bias in the types of sectors both the sectors of projects that lend themselves well to this type of evaluation.

You can imagine a health or an education or an infrastructure project that has very precise locations where the timing of implementation is also very precise, lend itself better to using geospatial data for evaluation than a governance or a capacity-building project that's more diffused throughout a larger geographic area.

[00:45:00] In the same vein, there are challenges in finding outcome data, in satellites or georeference survey data that is relevant to projects in specific sectors. Survey data does help to fill some of that gap but it doesn't have the benefits that satellite data has in terms of frequency, of data collection, global coverage and the historical record that, again, is really critical pieces of being able to use it for impact evaluation.

[00:45:30] I will say there are some exciting work being done to use nighttime lights as a proxy for economic development. We're just starting some work with researchers at Stanford and other universities to actually use roof type as to create a measure of household wealth and using survey data to validate that.

[00:46:00] It's tracking quite well so we're at the beginning of that effort but I think, as we've all talked about, these opportunities are just going to continue to grow and I'm hopeful that as more data exists and as more people are paying attention to this, we'll be able to overcome some of those obstacles to find development relevant ways to use geospatial data.

Carrie Stokes: Thanks, Rachel. Jenny, what kinds of barriers have you all come across in the many years that the SERVIR program has been in place?

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Jenny Frankel-R: Well, you nailed it. When you've been doing it for 12 years, you encounter barriers. We have synthesized them into five categories and they're specific particularly to satellite data and some of the challenges with that and maybe they apply more broadly. The first is technical or technological. That's everything from internet connectivity to having reliable power in the places where we work, to having the licenses to work with software. Again, we're talking about building capacity of developing country partners to use these resources themselves.

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That's one. Another is data sharing and satellite data is not reliable without local data to calibrate and make sure that it's valid and relevant and accurate. The willingness of different partners to open up data and to share it and to integrate it to make satellite data to actually useful and relevant can be an issue, especially in transboundary issues.

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One of the benefits of satellite data is that it does cross country borders and it can be an incentive actually to opening up data sharing but there are a lot of disincentives to do that in a lot of countries. I would maybe say the biggest is hard to choose but really dissemination so there is a lot of data, there is a lot of analysis, there is much less, I think, on this stuff effort or the effort is not adequate to the challenge of really getting information out and making it really, truly understandable and actionable.

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That's a big one. I will say that that's also the flip side. Some of that is working better than existing systems to get information out so that's not unique to the challenge of satellite data but just in data for development decision making generally. Then the last or two more I guess, awareness and demand. People aren't aware of what satellite data can do or they have unrealistic expectations. We've had some meetings with different stakeholders who would like us to see the clouds or give them a satellite.

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There are some lack of awareness and understanding about what's possible but that's growing all the time. The last one is sustainability. Some of this requires an investment whether it's in training or in insuring that there's a reliable stream, resource of data. The willingness to pay of people varies. As I said, where you can automate, where you can look for solutions that take advantage of other efforts. That sustainability is more likely. I want to add one that's not exactly in there but is cultural.

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Scientists and researchers measure success in one way and that's largely having valid models or having publications. USAID and our development partners measure success maybe in terms of the number of people who are able to access information or the reduced loses. Those two measures have to be aligned and it's really our job and all of our jobs to figure out how to make those aligned. We're helping researchers get the success they need and using that in a way that then helps our partners to make it really, truly very valuable from a development perspective.

Carrie Stokes: Thank you for sharing those insights. I think that they are quite valuable and I'd like to ask everyone of you on the panel for a quick snippet of advice that you would share with people and organizations who may want to take advantage of these new tools, they evolution of geospatial technology which is continuing at a phase that even we're all still trying to keep up with. What one piece of advice would you give? Let's start with Chris.

[00:50:30]

Chris B: Well, I think and not to disparage the scientists and researchers up here but I think when you're working with the bottom of the pyramid as we are, there is a tendency to overengineer. This idea that more is better. In reality, to distill information in a way that's essential and meaningful and that compliments the community base of information that's out there is what I believe is really going to be meaningful and sustainable. In our project, we've had a lot of offers and interest to create much more complex tools and models and I think, for me, the issue is is it understandable and is it reliable? I'm more than happy to add complexity if it's understandable and reliable but if it's not, then I'd rather do without and give these individuals the essential information that's digestible and relevant and reliable. That would be my tip.

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Carrie Stokes: Great, thank you. Rachel.

Rachel Trichler: All right, so building on my last remarks. There really is potential to expand the evidence base with new tools and to do it pretty small inputs. My first plug would be to record, if you're an implementer or you're managing a project, keep spatial data of what you're doing. It does not need to be complicated, it can be a simple as a spreadsheet that has a location, coordinates and the timing of implementation at that location.

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We have worked with that to do impact evaluations once a project has closed and that is a great starting point. Then, the second piece would be to make that information as publicly available as possible and accessible. A few of us have touched on that and that will help to overcome that connection challenge of getting the data in the right place and joining people who know what's happening on the ground.

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Know where the project took place and then, those who can bring in other sources of geospatial data to really leverage that project information. On making those connections, another piece would be to reach out. If you want to use geospatial data, find other people who are working with it already, who know what to do with it and talk to them about what you can do in your organization or in your projects.

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The GeoCenter, obviously, is a great resource. There's lots of great resources at USAID. There is organizations, there is researchers who are working on this. I am always excited to have someone reach out to me and say, "Hey, I'm working on this project. Here's the information that we have, is there something that we can do with this that we incorporate geospatial data to learn from what we already have?" I think everyone in this position is excited to have people who want to make better use of geospatial data and to bring that to bear, to answer development

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challenges.

Carrie Stokes: Thank you. Laura.

Laura Hughes: Yeah, so my advice is I think it's really easy to get sucked up into the excitement about using new tools and new data to solve problems. My advice would be don't ignore the fundamentals. Jenny had a lovely turn of phrase in her SERVIR video which is talking about the chain from information to action. That is everything from [00:54:30] really defining the question, "Why are we trying to do this analysis to collecting all the data, making sure it's good then doing a rigorous analysis and producing the maps and the visuals and then applying it to a decision?"

[00:55:00] We think, oftentimes, when we get pulled into work, people are really focused on the end results of, "We want a map," or "We want a dashboard," or "Make us a visualization." That's great but I think the two areas that really need more attention are the beginning and the end of it. Similar to what Chris was talking about, the overengineering, really defining the question of why are we trying to do what we're doing.

[00:55:30] Making sure that everything falls out from that so that you don't have an overengineered solution or you don't have a dashboard which maybe beautiful and can do everything that you can want to but doesn't actually answer the question that you need it to. Then the second part which, I think, is often ignored is the end part of the application. I think we often naively hand off a map or a visual or a website or a tool and say, "Look, presto! This will solve all your problems."

Oftentimes, we've had feedback which is, "Well, this is great. I totally understand the results of this analysis. This is very clear but I don't know what to do with this." I think that that really goes back to forming a collaboration and a partnership with the decision makers to make sure, not only do they understand the information, but understand how it relates to the problem that they're trying to solve.

Carrie Stokes: Thank you. Jenny.

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Jenny Frankel-R: This is such good advice. One analogy that my colleague uses is a black hole and the purpose of it is to say decision support work is really a mind field. He goes online and looks at, "We did this tool. We did this decision support product," and figure [00:56:30] out how many of them are still working after the end of the project that supported them. He think it's about 10% so I think being aware of the difficulty in sustaining these kinds of things from the start, it's a very humbling endeavor.

[00:57:00] My advice would be that one institution or one person or one skill set can't do it all. To think really carefully about the kinds of skills and teams that you form to do this kind of work, what happens when you put a remote-sensing specialist and an agronomist and a programmer and a local partner together is amazing. One of those people alone could never dream up and come up with the kinds of solutions that you can with the right mix of skills and expertise. Like others, I would say to

[00:57:30] partner. SERVIR, as a project, is very open to partnerships but our partners are also very open to partnering and a lot of this capacity really exists out in the regions where we work.

Carrie Stokes: Thank you, Jenny. Thank you everybody for your insights and for sharing your experiences. I think this has been definitely inspiring for me, certainly, to hear about what everybody else has learned along the way in what they're doing. Thinking about, really, where we've been in the past with geospatial technology, what we're currently working on and where we want to go in the future, as this technology continues to evolve, and is exciting, to always remember the people. The people in the communities that we're ultimately trying to help.

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[00:58:30] It is easy to get lost in the flash of the next tool but if we always ground ourselves with the picture of the person or the face of the person that you are ultimately hoping you're working with to help, no matter how high out we get in the sky with the latest satellite or now the small sets that are coming out, we almost could give people they're own shoebox-sized satellite because that's happening in this day and age as well, it's always important to remember that it's always about the people.

[00:59:00] We are in this effort together and partnership to help solve some of the greatest development challenges of our era. We've got to work with the people on the ground who are facing these day in and day out. To get in that chain from data to decisions, it's not just a straight path, it's a process, an iterative process. The decisions we have to be clear about before we even start at the beginning of creating a solution.

[00:59:30] As you walk away today, I hope you can reflect on some of the stories that you've heard about how this data and technology is being used. We're quite proud at AID of being, what we believe, is a leader in the international development world for these kinds of investments, these kinds of technologies. We really like to consider the fact that we're not just trying to create the next generation of maps for USAID but the next generation of mappers for the world. Thanks.

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