GEO-REFERENCED DATA TO INFORM EARTH OBSERVATIONS MODELING FOR AGRICULTURE: A DISCUSSION AMONG COLLECTORS, USERS, AND AGGREGATORS

PRESENTATION TRANSCRIPT

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PRESENTERS

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Julie: *All right, hello everyone. We're going to go ahead and get started.*

Julie: *On behalf of Agrilinks, Feed the Future, and the USAID Bureau for Food Security, I would like to welcome you to our webinar today on georeferenced data to inform earth observations modeling for agriculture, a discussion among collectors, users and aggregators.*

Julie: *My name is Julie MacCartee, and I'm with the USAID Bureau for Food Security, and I'll be your webinar facilitator today, so you'll hear my voice periodically, especially during our question and answer session, and see my name throughout the chat box periodically.*

Julie: *I'm really excited about this webinar today for a few reasons. First it's essentially the culmination of our really excellent earth observations month on Agrilinks. We've been featuring a ton of interesting blog posts and kind of brown-bag style webinars, a lot of interesting information, and you can find the links to most of those blog posts on the left side of your screen, and the links that we have currently, so check out that blog series on Agrilinks.*

Julie: *I'm also excited because it's been a little while since we've done an Agrilinks webinar. We've been going through some transitions at Agrilinks. It's being managed by a new contract called the Knowledge, Data, Learning, and Training Activity. And so we're excited to look ahead and get restarted with our Agrilinks webinar series.*

Julie: *Before we dive into the content today, I would like to just go over a couple of items to orient you to the webinar. First, please do use the chat box to introduce yourself and let us know where you're joining from, and thanks to everyone who has been doing that already.*

Julie: *The chat box is your main way to communicate today, and we encourage you to use it to post questions, share resources, and discuss the topic with your colleagues on the event.*

Julie: *We'll be collecting your questions throughout the webinar and will probably enter some of them along the way in the chat box, and will hold some other questions until after the presentation.*

Julie: *Lastly, this webinar is being recorded, and we will email you the recording, the transcript, and some additional resources once they're ready in about a week-and-a-half's time. And they'll also be posted on the Agrilinks website.*

Julie: *All right, I am going to go ahead and get this rolling, and introduce two of our speakers who will then introduce our wider league of speakers.*

Julie: *The first person I'd like to introduce is Kiersten Johnson with the USAID Bureau for Food Security who has spearheaded Earth Observations month on Agrilinks and has really done such a wonderful job bringing this information to the future community.*

Julie: *She is an international population and health demographer with 20 years of experience conducting in-depth analyses of demographic and health surveys and service provision assessment data, and*

she's currently serving as a monitoring and evaluation technical advisor in the USA Bureau for Food Security's monitoring, evaluation, and learning division.

Julie: *You'll probably see her in the chat box and she'll be providing a wrap-up at the end.*

Julie: *And then the other person I'd like to introduce, is Paul Tanger who is also with the USAID Bureau for Food Security, and he is an agriculture research advisor with BFS where he manages bio technology and crop improvement projects, and previously as a AAAS science and technology Fellow. He led the launch of a new initiative focused on data science and agriculture, as well as developing open data policies and examining and visualizing impacts or research funding.*

Julie: *Paul is going to take it away and kick us off with an intro to the content and to our other speakers. Paul.*

Paul: *Thank you, Julie, and welcome everyone. Thanks for joining today. I am happy to be here and excited about this topic. I'll share some brief opening comments to frame the webinar today, and lead into a great line of speakers followed by a discussion after which my colleague, Christian will close today's session.*

Paul: *I would briefly highlight our presenters and then share some comments and then turn it over to our presenters to talk in more detail about this topic.*

Paul: *So first up we have Narendra Das with NASA at the Jet Propulsion Laboratory where he is a research scientist, lead adopter of the SMAT mission looking at soil moisture data and he's been working with the SERVIR project and will be talking about some of that work in Asia today.*

Paul: *Then we'll have Robert Hijmans, University of California. Works on data science applications and international developments with an emphasis on modeling spatial variations. So he'll talk about some uses that he's been working on there.*

Paul: *And then we have Philomin Juliana with CIMMYT wheat improvement looking at... [inaudible] and as part of several projects has been evaluating genomic selection and [inaudible 00:05:43] genotyping methods for improved wheat varieties.*

Paul: *And then we have Raghavan Srinivasan at Texas A&M University, professor and director of the spatial sciences lab. He has been working on the soil and water assessment tool model and modeling approaches using various sources of data.*

Paul: *And we'll wrap up with two folks that will talk about the platforms on which some of this data is being used and aggregated. First with Estefania Puricelli, University of Maryland Master's and Agriculture Economics. She's been collaborating with GEOGLAM in migrating crop conditions globally and manages aspects of that as well as coordinating the agriculture monitoring in the Americas initiative.*

Paul: *So last but not least, we'll have Jawoo Koo with IFPRI, part of the CGIAR platform for data and agriculture, and looking at ways to use open and multi-disciplinary data and data-science techniques for sustainable development impacts.*

Paul: *All right, so I just have a couple of comments and then I'll turn it over to our speakers. I think that Julie already highlighted that this webinar is nearing the end of the Agrilinks theme for this month of May, first observations for food security. Just wanted to highlight again how this is part of that broader theme and encourage you all to go back and look at some of the content that's already been shared there. You'll hear today about some of these systems and resources and you can find more with the link there.*

Paul: *I'm guessing you're all here because of the great purpose statement that we put together the description for this webinar, so I won't go too much time into reiterating that. Instead, I'll share an observation, and essentially we're hoping to improve the sharing and use of earth observation data through the discussion today.*

Paul: *So I thought this kind of observation captures a bit of what we've been thinking about and what we want to lead into today. And so the long tail is a phrase termed in the early 2000s to describe really large collections of rarely accessed information. This was originally observed for media, for example, books available on Amazon, but it's a common phenomenon enabled by the internet and sketched here in the low right of this slide for data as well.*

Paul: *So in the original graphic highly accessed popular books and movies comprise the peak on the left, like the red shaded area, and to the right, you see a slow, long distribution that demonstrates, in the original example, rarely purchased, read or accessed books.*

Paul: *So on this slide it's been tweaked to describe data in the same way. Where well-characterized data is used a lot, on the left, but lots of data potentially is never used, the long tail to the right. So today we're hoping to convene groups to learn about more data resources and talk through the organization context of how this data, where it exists and how it can be better used.*

Paul: *And the question I think we'll come back to, is, do we need better organization, different data, or a bit of both?*

Paul: *I want to say a few words about the scope of the terrains where we are, because we can't address and talk about everything, and just clarify how we're defining earth observations and remote sensing. So others may have different definitions, but I believe our thinking is, earth observations is satellite based information about the earth, and that's versus airborne and ground-based sensors and observations and systems, for example, from planes, from UODs and such that we generally refer to as remote sensing.*

Paul: *As the Agrilinks theme has highlighted, there are many use cases, and a couple include monitoring and responding to disasters, better managing resources, detecting emerging threats, and tracking trends over time, so we'll hear about some of this today, and then hopefully continue discussion in further forum.*

Paul: *So just due to limited time today, I wanted to highlight some related topics that we probably won't get into too much detail, and these include PII, USAID data sharing requirements such as the DDL, sustainability of these systems and platforms, and more development of consumption and decision-making tools.*

Paul: *So more consumption of using these tools to make better decisions.*

Paul: *The outline of the line-up and how we're thinking about this, is having three groups of people and organizations, and so, one is generators of information. The second is aggregators and their platforms, and the third is modelers and users, and eventually end-users.*

Paul: *These are mutually exclusive groups. As you'll see the presenters today will all be doing a bit of these. So we'll start off in reverse order with the modelers and users, and then we'll go to a couple of examples of folks that are generating the data, and finally, the aggregators and platforms.*

Paul: *I already went through the speakers who are going to do some short presentations of about five minutes each, and then we're going to have some semi-structured question and answer, and then we'll have an open discussion, and Kiersten will close the session.*

Paul: *I'd encourage you all, as the presentations are happening, to share comments and questions through the chat box, and we'll get to those as we have time.*

Paul: *With that, I look forward to the presentations and a rich discussion today. Now I'd like to turn it over to Narendra, and thanks to all our presenters and organizers and all of you for joining today. Look forward to more discussion.*

Narendra: *Thanks Paul. Good morning everybody. I'm in Los Angeles, North America, and I'm glad to be in this group. I'll be talking basically about what we are doing right now, and what is my role, and how I got connected to this, and what kind of data is required in my work, so could you please go ahead with the next slide?*

Narendra: *How I am connected? Basically my background is, I'm a hydrologist and a remote sensing specialist, microwave remote sensing specialist, and I work for the Smart Mission and the [inaudible 00:15:24] mission and I lead all of them the platform, but also, we have projects from the NASA [inaudible 00:15:31] program and these projects were implemented, being implemented and was implemented in East Africa region which is still ongoing with some of the [inaudible 00:15:42] and we have active projects in lower Mekong basin. The project is all about drought forecast and crop yield forecast and especially in the lower Mekong basin it is rice, and in the East Africa region it is maize, so what we do basically in this project, is, we have models, which I will talk about.*

Narendra: *We run the model and the [inaudible 00:16:14] in the forecast mode and provide agencies with output and we are still in... Our application readiness level is close to eight. We're working with our end-users to use it, but we have too success with the USAID update, in lower Mekong basin countries that they have to make some submission as they have started using our drought product, and the labs at Vietnam Academy of Water Resources have started using our drought product, so*

they are still working towards provide them the crop yield [inaudible 00:16:59] forecast for that region so the project is ongoing.

Narendra: *So this is the outline of the model that we developed at NASA GPL with one of my colleagues, [inaudible 00:17:13], and this is a platform where we have proposed a hydrologic model with a crop model and it is a modified crop model which runs an ensemble mode. They both run in ensemble mode, and they are typical to ingest all kind of remote sensing data, and then to use the output.*

Narendra: *So as you see on the right side here, we have two segments, basically. One is an outcast mode and one is a forecast mode, so first the hydraulic model runs, and it provide all the input through the crop model, and the crop model ingest and assimilate all the information in an ensemble mode and then creates an outcast in the forecast, so we do seasonal forecasting once in three to six months, based on the climate forecast available to us.*

Narendra: *This whole model is known as the regional hydrological extreme assessment system, so it is an evolving process, so we are learning a lot from our users, especially those who are implementing the system in ICMRD in East Africa, as well as in ADPC Asian Disaster Preparedness Center in Bangkok, because they are the one custodian of this model right now. They are using it and they are learning from this, and there's a lot of things we are still putting in there, but the full model is ready and being used.*

Narendra: *And then I will just go through one of the examples what we are doing here. So this is just the showcase. This is the lower Mekong countries where this model is being implemented, and the [inaudible 00:19:05] project that we are working on this region through the last three years, and the project is about to end, but we are in a very good shape here, and we are providing them drought outlook forecast as well as the knockout, and also this will be, in the coming months we'll be able to provide them the appropriated forecast in real time.*

Julie: *We seem to have lost Narendra. We'll see if we can get him back on. If we don't get him back on in just a moment, we can move ahead to the next speaker. Apologies for just a little bit of technical difficulties and some site formatting issues. We are working on those. But in the meantime, if you would like to download a pdf of today's slides, you can see them on the left side of your screen in the file downloads box.*

Robert: *I'm with the University of California in Davis. We have several projects around spatial data and remote sensing. Today, I'd really like to focus a bit on crop insurance.*

Robert: *I can actually probably go to the next slide here. So I work mostly in East Africa, in fact, also been West Africa and elsewhere, focusing particularly on maize as well as rice. Rice is not so much in East Africa of course.*

Robert: *So, crop insurance. So crop is an interesting and extractive technology, or approach to help farmers deal with poor years and to bridge the gap of a very bad yield that they may have because of severe drought.*

Robert: *What's interesting is, there's some success stories. There's also failures. The question of course, now, why are there failures, and in part it's because of poor insurance products, policies have been devised and have been provided to farmers. Now there's different issues around quality here, but certainly one important consideration is to evaluate what are our extending availability crop yields, and when actually that event has happened, is accurate enough to support these insurance projects.*

Robert: *So remote sensing is currently a handle they use to provide index to underpin these insurance products. The problem with these products is that, or these remote sensing methods, is that they're often ad-hoc. They're certain based on legacy and other examples, but it's very hard to know how good they really are and which of several approaches you might take, would be the most adequate on particular conditions in a particular region for a particular crop.*

Robert: *To improve these methods, and to evaluate these methods, you really need to be able to do a better comparison, and to do so, we need large high-quality datasets.*

Robert: *So essentially, what I'm saying here, is to have a much broader understanding of which remote sensing methods work in this domain of identifying crops and estimating yields and estimating yield loss, we need access to high-quality public data in this domain, and it's going to be very interesting. There is data out there, but one of the biggest problems is you pairing sort of noise with noise. The collected data on crop yield is also very poor, so I think it warrants [inaudible 00:29:32] to get much better data, or you need help to make data that's available, that actually just make it available.*

Robert: *I've been part of, years ago, of a working group comparing ecological models, especially [inaudible 00:29:49] distributions where we were able to get data from six continents, and we got modelers of different sorts in the room, and this is a [inaudible] to compare these different methods, and that work will be very influential, because we are for the first time able to really compile datasets with very different characteristics and get a much deeper understanding about what works where.*

Robert: *Another very important thing about having some good public data is that you don't have too much of [inaudible 00:30:27] rather than a few private or closed entities holding all the data and be able to develop something, and just saying, [inaudible 00:30:36] this works. I think it's for the public benefit to have the ability to... it's a lot of innovation in this domain, so we really need better data, so we have a long tail, yes, we need to use more data that's out there, to truly evaluate the ability of remote sensing products to do crop monitoring, crop yields particularly, I think collecting data might be warranted. I'll stop there. Thank you.*

Julie: *Excellent. Thank you, Robert. Narendra, are you still there? Shall we go back to your presentation.*

Narendra: *I can go through my presentation, just from where I was, so you can just go to the next slide when I say it so that everybody can hear that.*

Narendra: *Okay, so I was in slide number 22, which is basically, so what we are doing right now, as I've mentioned, we have a couple of hydrological models which work with end-to-end modeling from hydrologist all the way up to the crop modeling, and what we are trying to understand there is, how*

the drought evolution, and drought onset, drought recovery, is affecting the crop yield, and how this information could be utilized by our end users for making and planning of water resources management, as well as food allocation and other resource allocation.

Narendra: *So this is one of the example where we show one of the output from lower Mekong region. As you can see, this study was done a couple of weeks ago where we generated the forecast, it was for May 31st, so the top panel you can see this is the severity index. This is basically from May 31st, 2018 and July 31st, 2018, and then you can see the forecast we did for the region and the forecast is being used by the lower Mekong countries.*

Narendra: *We also visited the site and they confirmed that the forecasts are pretty reliable and they have been using it for decision making and planning, and similarly on the right side, you can see that it's the all moisture deficit index, so the model is capable to give you all kind of, the suite of drought industries and products, whichever we can customize it according to the end-user's need.*

Narendra: *Next slide please. The next slide is basically, this is our capability, a demonstration which we are showing right now, and this is where we need the help from USAID and other agency groups to do on-ground data. So we have capability to produce the right yield of, county-wide, you can see we can do it from Vietnam all the way from 2013, so we have done simulations for 30 years back, and we have done the forecast also. But what we say, this may not be correct, because we don't have the right information, the farm management practices information, right cultivar information, and irrigation, and how it's being applied, are fertilizers being applied, so this is where we are basically feel ourself deficient and need help from the agency who has this kind of data.*

Narendra: *So the model is really catering to the end-users, and they're very happy, but we are facing this problem of data collection, and a few countries have reported, and they are willing to share, but sometimes whatever data is there with them, it's to consistent and not what we exactly want.*

Narendra: *Next slide after that. So the constraints what we have maybe is that credible quality data of farm management practices. [inaudible 00:35:17] data not available and few of the agencies not willing to share, and this is where we need help. Some of the data is haphazard and [inaudible 00:35:29] so if especially if you want to calibrate the crop models and count device, we need sometimes a dataset of yield and other entities, our crop entities, which are not always available.*

Narendra: *And then, the next slide is, as a potential for... so active collaboration with participating agencies in capacity building, so we are doing it very actively in most of the third world countries, where a month ago, started three weeks they will be in Vietnam and Thailand and we have a very fruitful meeting with all the agencies, and they promised to provide us data and we have to see how much they provide. So we look forward to work with USAID and the group to maximize the potential and chances to get entry to data and crop-related statistics that currently can't be enlisted especially for East Africa as well as for Southeast Asia. Thank you.*

Julie: *Excellent. Thank you so much, Narendra, and thank you all for sticking with us through this unexpected technical challenge, but we think we've fixed it. We've managed to help the slides not have any formatting issues, so that should help and we received some advice from the top offices,*

so it was the slides that was causing everyone to drop off, so we'll see if that fixed the issue. I think now [crosstalk 00:36:59].

Tom: *All right. Very good. So I think we'll be starting out with the mission and vision of CIMMYT. I think most of you are aware that CIMMYT is a member of the CGIAR, and that we have at least a 55-year history of distribution of germ plasm, the improvement of germ plasm, and the evaluation of germ plasm worldwide.*

Tom: *If we go to the next slide, the global seed distribution of CIMMYT involves distributing improved materials of maize and wheat germ plasm. The distribution is on demand of the recipient, and so the network that we have is rather ad-hoc. It's not always planned. We don't always have the same location year after year. But nevertheless, we have a very extensive network of collaborators worldwide.*

Tom: *If you go to the next slide, the international wheat improvement network is what we're going to be talking primarily about today. This evaluation network distributes spring bread wheat and germ wheat and winter wheat lines globally. We have more than 28 [inaudible 00:39:05] and replicated yield trows that we distribute, and that goes to about 240 collaborators in 80 countries. We have an enormous airfreight bill because we're distributing more than 10 tons of seed annually, and it's all distributed free of charge, and it's covered by the SMTA.*

Tom: *Now, this issue about being distributed free of charge, is important, because the network is a voluntary network, and the primary intent is to distribute seed to our collaborators, and not necessarily to obtain high-quality precise phenotyping. That's something that has come about more recently, and we're looking at ways of increasing data return. Historically the data return rates have been 40 to 50%, but we're wanting to increase that, and we're wanting to focus on obtaining higher quality data.[40:15]*

Tom: *So with that, I'm going to hand over to Rosemary and the next slide on the platform serving ground-reference data.*

Rosemary: *Thank you, Tom. CIMMYT Dataverse is a platform that we are using for the publishing all CIMMYT data including adding data. So you can go to CIMMYT'S website, www.cimmyt.org, which takes you to CIMMYT'S website there, and you will find data under the tab, Resources, which brings you to a data page where you can see the lanes related some of the other data resources.*

Rosemary: *If you click IWIN Data on Dataverse, it will take you to the page where you can see all the IWIN data for that subject. Then there's another slide, and since there are so many clicks, I hope we are in the second slide.*

Rosemary: *You can also type, or directly go to data.cimmyt.org, which takes you to the Dataverse page, and then if you click one of the published studies, for example, here I go 27th of April, and you'll be able to see the meta-data related to this study, and then the other finds that are published for those particular studies.*

Rosemary: *You can download all those datasets which include pheno-specific data, location data, main data, [inaudible 00:41:54] draw data, and then, if you click a particular dataset, specially for the variables and traits, so pheno-specific dataset, then you can see all the variables that are actually maps for crop anthology as well, so that's like, you know, [inaudible 00:42:11] data inter appraisal.*

Rosemary: *So the location data, so you can see also in the column, so there are locations like Spain, collective data from Spain and from Iran, and then several values of data here. So location would be the most important data for this group, since we are talking about [inaudible 00:42:38].*

Rosemary: *And then, apart from the agri-data, so there are also important data sets that we have, and then that is like in collaboration with KFU on the Feed the Future project so we have generated [inaudible 00:42:52] data. Anybody can go there and download the data. So Philomen is the one, so who is controlling this data, and she will explain about it. Thank you.*

Philomen: *Thank you very much. Next slide please.*

Philomen: *So there is a slide that says predictive modeling of wheat yield using spectral additives from high [inaudible 00:43:15] phenotyping. So if we can go on to the first animation there, so we have yield files. Our yield files are on Obregón, Mexico, and we have about 30,000 plots, small plots of land that we phenotype using drones and airplanes, so if you click on the next animation there, you can see we use both a [inaudible 00:43:39] 100 using a red edge camera, and we also use a small clipper aircraft with a hyperspectral camera to get hyperspectral data.*

Philomen: *And then we have ground control points at different places in our fields and then we also do georeferencing giving basic IPK GPS, and once we have all the images, then they are all processed and geo-referenced, and then we have [inaudible 00:44:06] vegetation indexes for different plots, and so we have different indexes like NDDI, the normalized different vegetation index or canopy temperature, depending on the different camera that was used to take data. Because we have a thermal camera, we have canopy temperature data, and once all the data is taken, we have the different plots, and different indexes for every plot.*

Philomen: *The next slide, please.*

Philomen: *Here we have information about how is data used at CIMMYT, so we view prediction modeling so we have all the phenotyping data, the yield data, and then we have genotype data, so about 50,000 lines have been genotyped so far at CIMMYT, and then we have inline barriers like temperature, precipitation, humidity, and all those factors, and then we use all this information collectively, or in separate different models to train multi-variable prediction models, so we're trying to predict grain yield here using the spectral indexes, or using molecular markers, or using environmental data.*

Philomen: *Once we train these models, we try to estimate something around the breeding value of the lines, so we're trying to predict the performance of wheat lines for grain yield, and then for lines with higher breeding values, and use them for advancing generations.*

Philomen: *So this is a quick process that we can do to speed up conventional breeding, and on the lower right corner of this slide, I have some prediction I can review that are within and across years, so these are two different environments that we test yield for, with drought stress in a heat stress environment. As you can see, this is a prediction using [inaudible 00:45:47] typing data from... this is just the normalized different vegetation ended, and that's about point four, say, point five stakes, so these are quite high [inaudible 00:45:56] try to predict.*

Philomen: *But they try to predict the yield across years using from previous years' data to predict the next year for our new future environments and that prediction becomes challenging, so one of the things that we would like to see, is, can we use some crop-growth models to be able to incorporate a lot of other methodological variables and account for soil variability, micro-environmental field conditions, and use them to improve prediction accuracy.*

Philomen: *That's all we have from here. Thank you very much.*

Julie: *Thank you very much. Raghavan, are you on?*

Raghavan: *Good morning everyone. My name is Raghavan Srinivasan, A&M Texas University. I have a faculty here, and working with geo-spatial sciences. It includes all the conference of DIS and remote sensing and GPS as recently grown technologies for natural resources. So spend our natural resource modeling. One of the model that we have developed is called SWAT. Stands for Soil and Water Assessment Tool.*

Raghavan: *This is the largest application of the SWAT model in the world today, and we have more than 4,000 peer review publications, and this tool is being currently used in Feed the Future projects, including a project called ILSSI, stands for Irrigation for Small Scholar Dairies, for small holder farms.*

Raghavan: *So in applying this, we use the earth observation both as an input to the model, but also on the backend of verifying the model output actually, so in other words, where we have some other [discontagial 00:48:10] deficiency in ground tools datasets we use the remote sensing dataset to input as an input to this model, but also, on the other hand, we will also be able to verify them such as aerial [inaudible 00:48:23] index and NDVI and biomass and primary productivity and so on and so forth.*

Raghavan: *So the model is quite versatile, and I think you heard some of our data as good modeling before. This is more for hydrology, crop growth, water quality, that's including pesticides, bacteria, nutrients and so on and so forth.*

Raghavan: *Some other areas that we worked on, we worked on almost all around the world actually. We have our applications almost in every part of the countries around the world, and most widely we're used in the US, the North American countries, so there's Europe, and the Africa continent, actually. Currently we are mainly focused on much more detailed analysis in Ethiopia, Tanzania and Ghana, and we're also getting into the Western Africa in the second phase of our ILSSI project.*

Raghavan: *We looked at all kinds of cropping systems that includes all the way from foreign fiber over to forest, biology crops, grasses, including animal operations and so on. Some of the product that we generated over the years, you can easily look at how much water is available. How much is the soil productivity and the soil erosion and soil moisture, and also looking at transpiration and water pollution and so on.*

Raghavan: *We also use remote sensing to either define the reservoir operations, actually, reservoir management of reservoir water levels, especially when the countries are not sharing data across trans-boundary issues, we may have to use remote sensing technology to identify the water levels and the potential risk of flooding downstream, and you also looked at large wetlands like in South Sudan and things like that.*

Raghavan: *Some of the constraints that we always face that everybody already alluded is the availability of the data, and the quality of some of this dataset. Sometimes the data is not available, but in times it is, and the special resolution that we are interested in, which is the nature of the data, so we have to live with that, so it's not a complaint. It's more of a opportunity that if more and more of the data that's generated from European agencies and the US and the Japanese and others could be all shared in a common platform, maybe that is a way to overcome some of these issues.*

Raghavan: *And access to existing datasets from the local... again, some of the previous speakers mentioned that. That's the same theme repeating here, and those data need to be made available in a public domain form, or at least in a somewhat easily accessible form, actually.*

Raghavan: *The next topic of big data is both an opportunity and a constraint. It is just evolving, so it's got a long way to go in terms of making the data become available, and in a consistent and uniform form, such as the Google engine is one of the fine effort to make the data available in a consistent form, and easy access to the computing requirement, so we are using Google as the engine in a lot of our applications.*

Raghavan: *But they do exist in different format, so that becomes a challenge. How do we transfer data from other data? It's so huge, it's not easy to manipulate them when they are in a different format and things like that.*

Raghavan: *The opportunities, like I said, the cloud systems, so the big data initiatives in various areas is going to become a real opportunity in the future for new research and collaborative research, and able to integrate both model data as well as observation data into one platform, and the validation and verification of some of this data is always questionable, so this is where we need some kind of a crowdsourcing where people are able to chime in and provide their input, just like how the private companies are collecting crowdsourcing data for their benefit like, take an example of traffic. So now you can get a realtime traffic through crowdsourcing actually, so in a similar manner, we could able to collect data through crowdsourcing and improve the remote sensing of the earth observation dataset.*

Raghavan: *Capacity building is always required, because the technology is changing so rapidly, we have to keep up on our tools to make sure everybody is on the same boat and able to use the same*

technology and tools and software and so on, so capacity building is a very integral part of any [inaudible 00:53:44] coming feature.

Raghavan: *So far, the real data is becoming an issue in terms of affecting model data versus mostly sense data. Both are considered as models. It's not real observations, so those will be supported, so that means that is a way to accept the models themselves that data is going to a remote sensing or earth observations or vise versa, should able to be easily interchangeable and able to go hand-in-hand in terms of knowledge and information and so on.*

Raghavan: *So maybe stop right there, and maybe answer a few questions later.*

Julie: *Excellent. Thank you so much. Estefania, you're up next.*

Estefania: *Thank you. Good morning everyone and thanks for the opportunity. Today I am going to show you very briefly the work I was in is AMA. They are concern monitoring in the Americas. A very young initiative that was started formally last year but that's within [inaudible 00:54:58] and 12. So AMA is a [inaudible 00:55:00] regional network coordinated by the University of Maryland. I'm a part of the AMA team. My [inaudible 00:55:06].*

Estefania: *So who we are and what we are doing? AMA is a regional network that intends national monitoring system and their participation in the Geolam community. For Geolam, it's a different initiative, created in 2011 to wherewith aiming to have [inaudible 00:55:27].*

Estefania: *The AMA working group, we are still developing [inaudible 00:55:33] this working area [inaudible 00:55:34] this is done. Accessing that information is in America for further research collaboration towards [inaudible 00:55:41] network.*

Estefania: *Capacity development and technology [inaudible 00:55:49] management of earth observation datasets, [inaudible 00:55:51] have that information.*

Estefania: *Moving earth observation information into the hands of decision makers.*

Estefania: *So which are the [inaudible 00:56:03] and crops? AMA works in all the America. North, Central and South America. AMA aims to have participation from all regions and country. Some of the crops that we work are for example, maize, wheat, soy bean, rice, sorghum, among other crops that the different countries might be interested.*

Estefania: *Our farms are not only countries [inaudible 00:56:29] but also [inaudible 00:56:30] among others.*

Estefania: *The constraints. At AMA, we try to make earth observations accessible to different users, like regional, national, and also locally. So after accessing latest information recently, we discovered that there are many private resources for remote sensing data that are free, so that's earth observation they too have that data, and then have that tools like webinars and [inaudible 00:57:10].*

Estefania: *But the problem that we find in the Americas, especially in South America and the Caribbean, is that not everyone is aware of those resources, and there are also many national resources for remote sensing, but they are sometimes hard to find, or they are located in very specific portal that are not very well known for a certain community, and sometimes even for the same country.*

Estefania: *So here we saw, and unfortunately we found a need for a centralized place to find regional earth observation data. We realize that the important need that the AMA community had for understanding and finding different earth observation products, maybe for their own regions, but also for other places, so we start developing a section in our website called Resources, where we can [inaudible 00:57:59] creating the different datasets like [inaudible 00:58:03] to databases, crop mass, and even some reports that [inaudible 00:58:10] monthly or weekly, but we reaching a point that we need to go a step forward to make [inaudible 00:58:18] more collaborative.*

Estefania: *So, with the help of my colleagues and [inaudible 00:58:24] we develop the AMA research hub. This platform use DNO software to with a combination of [inaudible 00:58:34] software that has Geoserver.*

Estefania: *So the idea of the, how they said it's a framework an environment that facilitate us to create a complex structure to manage resources that the database matched on any earth observation needs that they use that they had.*

Estefania: *The idea is for our clients to be able to share the information that they have, so for example, a conference where they go like, also Georeference data, but in a very user-friendly environment.*

Estefania: *We started this new platform, [inaudible 00:59:05] and we're going live this week, so you can access using the website that is on the screen. So far, the contributions sector are very positive. I'm very excited with the opportunity of making the [inaudible 00:59:19] for the generator, and also the idea is that it's a collaborative community for any of our partners. We try to help them with any issues that they may have, or like [inaudible 00:59:34] that they might need or different way to show their work that they are doing in their different location.*

Estefania: *So on that side, thank you very much for the time.*

Julie: *Thanks very much, Estefania. All right, next on our list, we have Jawoo:[inaudible 01:00:02]. Speak again, Jawoo:. There's a little blip right there, but I think you've [inaudible 01:00:04].*

Jawoo: *Okay, as the last presenter of the webinar today, I'd like to give another example on the platform and aggregating the data. So from CCIR's side, we have been also trying to understand the kind of data we have collectively from all these different locations and how we can make them more useful, and they're organized for the data modeling and data science in most of the regions.*

Jawoo: *So the map you are seeing now, is the location of our [inaudible 01:00:48] georeference like [inaudible 01:00:50] from CCIR, and we found about 1,000 different locations, which were started from 8,000 scientists from over 15 centers, the certifications are located in 57 countries and many*

of them also from... they have seen this presentation also the use for [inaudible 01:01:12] and breeding et cetera.

Jawoo: *So we have lots of location, lots of [inaudible 01:01:19] but if you ask, okay, so where to find all this data, that answer is not simple, and we try to do a better job.*

Jawoo: *We are a platform, as a platform for the [inaudible 01:01:58] program are launched in 2017 as one of [inaudible 01:02:03] and we definitely support adequate [inaudible 01:02:08] public data, and this have been a lot of activities are being supported by this program, and the main module or flagship within the platform is called [all one life 01:02:23] and this is where a lot of data creation, data generation, support and management all keep happening [inaudible 01:02:32].*

Jawoo: *As we saw before, there are lots of data sources out there. It wasn't easy to find where to go and what kind data it can generate, so together [inaudible 01:02:50] and now we have a flagship product called Guardian. There is a URL in the fly if you can follow the link after the webinar, you will be able to search any dataset of your interest, any year, and topic, and you will receive [inaudible 01:03:07].*

Jawoo: *One of the things they are trying to do a better job is not just making data open, and make it findable, but also make it very useful and [inaudible 01:03:17].*

Jawoo: *This slide is illustrating our effort to create a youth cave together with pop modeling community so that they can find data from different sources in this kit, three different sources, link them together on the fly for the most useful format for crop modeling application. Maybe try to continue growing wave to make our data more useful and more discoverable and findable for different modeling communities.*

Jawoo: *We recently ran a survey to our different, special scientist coming to practice in HIR and we found many different types of data including plenty of event cover and trial and household data, which are other applications [inaudible 01:04:12] and with a making outcome fielding proxy indicators and modeling [inaudible 01:04:18], so we saw a lot of opportunity. The application is already been developed.*

Jawoo: *However, I've discussed all your slides, and we also have [inaudible 01:04:29] with input not always... There are other useful and reliable statistics data to begin with, so sometimes we just have to do our own data collection to improve the effectiveness of our data and [inaudible 01:04:43]. It would be better to confer these efforts together [inaudible 01:04:55].*

Jawoo: *So maximizing various data already collected has been a challenging issue within our application. People are improvising to make extra effort to make better use of data [inaudible 01:05:09] to our researcher to make better use of the data they collected.*

Jawoo: *Another thing that is started seeing is that the [inaudible 01:05:24] publish the data, we often time publish more successful stories and data showing significant treatment effect rather than the early messy and uncertain nature of our trials and each time on the bounce.*

Jawoo: *Yeah, [inaudible 01:05:43] like to discuss it with whoever having same problem, similar issues in the researching gear. And also, responsible data management is a continued current issue that, as a community we all have to work together to ensure that privacy and ethics are being handled correctly.*

Jawoo: *[inaudible 01:06:13] benefit there, for example, [inaudible 01:06:19] very different, a collection of eight hours, or the data already over and over, and in such ever format. If there is a researcher making data already useful and everything and make it [inaudible 01:06:39] if increasing our visibility and validity and the [inaudible 01:06:42].*

Jawoo: *And [inaudible 01:06:44] I've mentioned before, and another thing I wanted to point out is, so another in everyday data already collected, another trend of activity that they are doing. [inaudible 01:06:57] data collections from the [inaudible 01:07:00] and they have hopefully other chance present that on a different location.*

Jawoo: *I'm going to stop there for more questions. Thank you.*