

Hello, my name is John Ignosh. I am an advanced extension specialist in the Department of Biological Systems Engineering with Virginia Tech and Virginia Cooperative Extension. I am going to give a brief presentation on using Geographic Information Systems to assist in exploring opportunities with ag/forestry tech and vocational education training schools in Central America. Some of this content was originally presented at two USAID sponsored workshops. The first was Opportunities for an International Teacher Certificate Program in Ag and Forestry TVET programs held in April 2017 in Costa Rica. And then, a second conference in Washington D.C. sponsored by USAID titled Intersections of Policy and Practice to Strengthen Ag Education and Training Systems held in June 2017. The background concept for this work and this presentation was originally, with data put together by Dr. Quesada and Brianna Anderson with the Department of Sustainable Biomaterials with Virginia Tech and Extension. Where they initially created a tabular database of TVET, ag/forestry TVET schools throughout Latin America and then brought that into a google map.

To the right of the screen you see the push pins representing the different ag forestry TVET centers throughout Latin America. The primary goal is to identify where these ag and forestry TVET's were located and some additional attribute information. Kind of like a TVET yellow pages for ag/forestry schools. So with this resource in hand, this tabular data set and also the google map version, explore some opportunities of how we could leverage that information, really just to help facilitate project analysis, project exploration, and be a resource in a variety of different ways. So the rest of this presentation highlights some example use cases for this database and how it could be put to use in a variety of different situations.

But backing up just a little bit, how it could be used really depends on the project scenarios and the goals of the entities involved. Where could we add other data sources of interest to help explore a variety of opportunities? So opportunities in the ag/forestry sector, the specific needs of that zone, maybe some donor priorities in a specific geography, and then of course the ag/forestry institutions themselves that have mandates for hands on learning opportunities in that zone traditionally work with the youth in those areas. And some examples to facilitate the integration of TVET centered data with other geospatial data regarding regional priorities, opportunities, and interests within the TVET's "zone of influence." And by zone of influence simply all we mean here is areas where they recruit their students from and also areas where their students were able to be placed into jobs. For example, characteristics of student recruitment and grad employment, entrepreneurial zones, ag and forest sector businesses in the zone, the zone of influence of a given TVET, food and public citizen security challenges of the region. Maybe there's some unique food security issues in a particular geography as there often are. Maybe there's some citizen security, some safety challenges, or gang activity, things like that that are predominant in a particular area that might be a challenge for the school, for the youth in that school.

And then maybe also an opportunity to share some experiences, best practices, insights gained from other projects from other TVET centers that experience similar types of situations. What are some of the donor funded initiatives that happen to overlap with a given TVET zone of influence and a wide variety of potential applications. It really runs the gamut. Again, this is just to spatially explore what else is out there within the context of any given ag forestry TVET, and explore some project collaboration opportunities, project development opportunities and also as a way to perhaps build a network to

efficiently share some best practices, lessons learned from one TVET to another. So could this be useful? Well that depends, right, it depends on if this could be useful from the TVET's perspective or it could be useful for other collaborators' perspectives, or both? So, we're proposing using this occasionally as a tool. In certain applications, it might make sense; in other applications, it might not be appropriate.

But again think of it as an ag/forestry TVET yellow pages and then from there within the spatial environment we're able to bring in other layers of interest to explore project opportunities. And here's some of the examples.

This is from a project poster that was displayed at the two conferences earlier in 2017, and we'll kind of go through in this presentation a couple of these examples of sample use cases for when this type of database or this kind of information could be useful to officially glean insights into certain project opportunities again either from the ag/forestry TVET's perspective or maybe from some other entity looking to do project work in a certain area.

So the tabular TVET data was geocoded within ESRI ArcGIS Map software. Additional TVET attribute data was then solicited via email through an online survey using Qualtrics Software. This was leading up to the April 2017 event in Costa Rica. This figure includes a map of identified agricultural and forestry TVET centers and a sample of the online TVET center attribute survey. So here zooming in to one of these stars, here we are in El Salvador looking at a technical school that is overlaid with a area of the livelihood zones in El Salvador. And then within that TVET are 200 students, they age from 17 to 18 years old. This is a two year program. There are seven teachers and within 50 kilometers approximately 66% of the students are recruited and about 100% of the graduates go on to work. It gives you an idea of the types of livelihood zones data from the FEWSNET/USAID network. You can see where those students are recruited from. Then also the zones where they go onto to be employed in.

Now, here we are, a TVET in Huehuetenango, in the Western highlands of Guatemala. Again this is TVET information about an institute, a TVET institute called ITAGRO which has 150 students ages 15 through 18 with 10 teachers, within 50 kilometers, that circle there, 40% of students are recruited and 40% of the graduates work. The data from FEWSNET in this case is actually from the FEWSNET Early Warning System that indicates food security stresses indicating throughout the Western Highlands at the time that this map was created, predominantly orange and yellow throughout much that area which is phase 2's yellow, stressed. And phase 3 is crisis. So what might be some of the unique opportunities for an ag/forestry TVET located in an area experiencing food security issues?

For example, ITAGRO is in the Western Highlands of Guatemala. Now with the same school ITAGRO looking at different types of projects, the green dots are the Anacafé communities, the National Association of Coffee communities. The brown dots, are producers involved with AGEXPRONT, and the magenta dots are Farmer-to-Farmer communities. The square icon, with the green Earth inside of it, represents USAID projects that are focused on Low Emission Development Strategies, whether it's improved cooking stoves, renewable energy projects, those types of initiatives, those are physically where those projects – activities with those projects have occurred in that zone. Now from an ag/forestry TVET perspective, from an institutional perspective, perhaps there's opportunities for that

school, for the teachers in that school, and for the students, for future graduates to be involved at some level in the dots within that 50 kilometer radius of the school. Again, ITAGRO in Huehuetenango, but here with the overlay were looking at information from US customs and border protection and GIS data again from USAID that deals with the location of origin of unaccompanied children and their mean age by department. Note here again the average ages of the students at this TVET are 15 to 18 years old. The Northwestern Highlands from the US customs and border protection data and the average ages range from 14 to about 15 ½ years old. What opportunities might there be to engage these youth, to find alternative solutions for youth that are right at the same age as the students enrolled at that TVET center.

And here we are in Southern Honduras. We're at a TVET Escuela de Agricultura Luis Landa which is in Southern Honduras and again the overlay here is also from the FEWSNET/USAID data looking at regional livelihood zones. So here we have 300 students ages 15 to 17 with 34 teachers; ¾ of the students are recruited within 50 kilometers and the predominant livelihood zones in that area are subsistence grains and remittances, labor income from melons and shrimp, fishing and salt production. So, some of these things give some insights into types of communities, production systems the students are predominantly recruited from.

Same school, different overlay. This school is also in an area that has some level of public security issues indicated by the number of homicides by municipality in 2015 and this data is from the Centro de Investigacion para la Prevencion de la Violencia – CIPREVI. So here we can see some of the municipalities within the recruitment zone for this TVET that experience relatively higher rates of homicides. So what might be some of the challenges for the students that come from those areas or what might be some of the challenges to that TVET when the TVET is actually located in areas experiencing problems with citizen security?

Here we are, still in Honduras but now we're on the Northern Coast at the Escuela de Agricultura John F. Kennedy and again this overlay here is with public security information homicides by municipality. This school has 240 students, 15 to 17 year old, 35 teachers, a third of them are recruited from the 50 kilometer radius around the school and about 100% of the graduates are going to work in that same zone. So these citizen security issues, what are some of the challenges that an ag/forestry TVET school either in recruiting students, students once they're enrolled at the institution, students going on to seek employment in some of these areas – what are some of the challenges and what kind of information resources could be shared from TVET to TVET or from other resources?

Here we are again with the same TVET but now with the regional livelihood zones. Predominant zones in this area are grains and livestock, tourism, and palm oil. Now these are some sample hypothetical use cases, but the main point here is it could be utilized in a variety of different ways, different context depending on who, what, where, when of any given project. There potentially are advantages from a TVET to be able to see activities of interest to them in their area, again their zone of influence, where they either recruit students from or where they have job placement activities and otherwise they might be involved in a given region—kind of the footprint of that. So what's going on in that space. But then also from outside, internationally, sometimes these types of data resources can help glean some potential insights everything of course to be vetted and ground truthed, but some of these things can

maybe help explore project opportunities, potential collaborations more efficiently and go from there. Again everything to be ground truthed and vetted, but for initial exploration this could be an effective tool to, fairly efficiently, look at or explore different opportunities in a given region of interest.

The data references here are from the TVET survey data that we developed and Dr. Quesada developed ArcGIS online data layers from AGEXPRONT Guatemala, ANACAFE Guatemala, Farmer-to-Farmer, Guatemala Low Emission Development Strategies Network, and CIPREVI or Citizen Security Information. FEWSNET—Famine Early Warning System Network—again from USAID. The USAID office for the Global Development Lab with Dr. Craig Jolley has information through the ArcGIS online data network, a variety of USAID layers that were used to give example use cases for this type of information. Thank you! Please contact me if you have any additional questions about this database, its use. My contact information is there, my email. And again my name is John Ignosh with the Department of Biological Systems Engineering at Virginia Tech. Thank you.