

Study abroad program students develop research skills despite being grounded

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Farmers in the Ecuadorian Highlands cultivate the land on steep slopes and face issues of soil degradation and erosion as well as food insecurity. Credit: Jillian Broadwell for Virginia Tech

This summer, Virginia Tech students Henry Adkins, Claire Gallihugh, and Leah Mwangi, along with recent graduate Tessa Hawley, spent more than eight hours a day glued to their computers cleaning data, running regression analysis, and otherwise finding answers to questions related to

conservation agriculture in Ecuador.

Although many [college students](#) wouldn't opt to spend their summers this way, these students were motivated and funded by a USDA grant that aims to develop international development research skills among undergraduates.

"I've always been interested in how environmental degradation can impact low-income communities, and this looks at how we can help them using [conservation agriculture](#)," said rising senior Claire Gallihugh, who is a double major in agricultural and applied economics and natural resources conservation.

The students just finished spending five weeks of their summer under the guidance of the Virginia Tech Department of Agricultural and Applied Economics faculty examining questions that seek to understand what the determinants of conservation agriculture adoption are and which factors are most significant.

The program is part of a five-year project that began in 2019 when the first group of undergraduate students from the Virginia Tech College of Agriculture and Life Sciences prepared, built, and administered a survey on conservation agriculture in the Andean Highlands of Ecuador. When plans for the second student cohort to administer a follow-on survey in Ecuador during summer 2020 were canceled because of public health restrictions, program leaders Jeff Alwang, Catherine Larochelle, and Susan Chen pivoted their process design to allow for in-depth skill development without the international travel component.

The resulting 2021 cohort was eager to help answer lingering questions related to sustainable agricultural practices in Ecuador using data collected by the 2019 student team, even though they didn't get to travel out of the country as is typically part of the program.

"Our objective going in was to teach students a skill set that they could apply both domestically and abroad, particularly in developing countries," said Associate Professor Susan Chen. "We focused on the training aspect of things, and I believe that we delivered on that aspect because we gave them from start to finish, a research experience."

In non-pandemic years, students would participate in a three-credit survey design course during the spring semester, administer the survey in Ecuador over the summer, and complete the program by taking a one-credit data analysis course after returning to campus in the fall to analyze their [survey results](#).

"In the typical program, the data analysis happens in a one-credit fall semester course, which is not enough time to get into the intensity of the data analysis that we're going to get into this year," said Professor Jeff Alwang, who leads the project. "Here we have less time spent collecting data and more time spent analyzing it. These students are going to develop more skills for the whole gamut of conceptualization of analysis to presentation."

In the reformatted 2021 program, participating students designed, programmed, and administered a survey during their spring semester, leaving the summer open for an intensive look at analyzing 2019 data from Ecuador.

While that survey was unrelated to the Ecuador project—it assessed how the transition to online classes caused by the COVID-19 pandemic impacted [student](#) learning—it did teach them skills and processes needed for survey development.

"They generated their questionnaire using what they thought were the most interesting questions," Chen said. "We were just guiding them so they would understand how to design a piece of software to collect the

data and how to take that software and turn it into machine-readable data that could be put into a statistical program to analyze it."

Program leaders said that the students needed to learn those skills and to understand the sequence of events involved in conducting development research before they could effectively analyze data from Ecuador this summer.

While the students didn't administer their survey abroad, they followed the same processes they would have followed in a developing country and encountered similar challenges to those experienced by their predecessors.

"We got to learn how to make a survey using CPro, which is a program made by the census bureau, so that was cool," said Leah Mwangi, rising senior studying economics. "And also learning about conducting surveys and the steps one has to take, like what we could and couldn't ask to maintain ethical survey standards."

The survey design and development process the students underwent during the spring semester gave them a reference point for viewing, parsing, organizing, and ultimately analyzing data from Ecuador this summer. They learned to use the statistical software STATA to answer some research questions—Mwangi and Hawley examined questions of food insecurity while Adkins and Gallihugh looked into questions of conservation agriculture.

Adkins and Gallihugh found that although soil quality and erosion are significant issues facing farmers in the Andes, only 20 percent of producers adopted a significant number of four or more conservation practices. Mwangi and Hawley calculated dietary diversity scores for surveyed households using guidelines from the Food and Agriculture Organization of the United Nations and discovered that 26 percent of the

population surveyed was food insecure.

Not only did the project provide more answers related to food insecurity and conservation agriculture in the region, which will be used to help partners in Ecuador address these challenges, but it also provided this cohort of students with an understanding of how social sciences observational research works.

"I've learned that it takes a lot of extensive work to create data, do a literature review, and make sure everything is comprehensive before putting anything in writing," Hawley said. "Catherine and Jeff have given us a lot of resources and explained a lot of things to us so I feel like I'm going to come out of this ahead and be able to use this training in the future."

And with just five weeks of intensive training, these students will be prepared for any research challenges graduate school or a professional position throws their way.

"Although we look forward to resuming the program with an international travel component, the students from this year's cohort are going to come out prepared for almost anything you can get into," Alwang said. "They're going to know some [data analysis](#), programming, how to think about these things. They're going to have an in-depth understanding. This is going to benefit them."

Provided by Virginia Tech

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