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By Mikayla Mace Kelley, University Communications - March 24, 2022

Individual actions are important to mitigate climate change, but more and more often, the general message has become: System-level change will have an even larger impact on the future. A group of University of Arizona students came together in the fall to drive change in this way.

Students in the Science Policy and Diplomacy class, taught by engineering professors Kevin Lansey and Hassan Vafai, teamed up with students in the Climate Change Adaptation class, taught by Gregg Garfin, an associate professor in the School of Natural Resources and the Environment. Together, they participated in a project hosted by the Diplomacy Lab – a public-private partnership between the U.S. Department of State and a network of U.S. academic institutions.

The Diplomacy Lab formalizes relationships between the U.S. Department of State and academic institutions so that faculty-led student teams can carry out research in collaboration with State Department officers around the world. Each semester, the Department of State provides approved university partners with a project menu of topics proposed by domestic bureaus and global embassies that can be undertaken by students of all different academic levels and disciplines.

Through a competitive process, teams bid for a research topic, and once the projects are assigned, the goal is for student groups to gain experience developing policy and presenting their recommendations to the State Department. The State Department can then use that information to inform policy change. The Diplomacy Lab was established in 2013, but the fall 2021 semester was the first time UArizona participated.

The UArizona students were assigned a project, developed under the Mekong-U.S. Partnership, that aims to find solutions to challenges in the region and to identify opportunities for the U.S. and the Mekong people and states. The students focused on improving food, energy and water security in Southeast Asia's Lower Mekong River Basin countries, which include Cambodia, Lao PDR, Myanmar, Thailand and Vietnam.

After months of research and brainstorming, four of the 12 students presented their policy recommendations in December via Zoom to Jung H. Pak, Deputy Assistant Secretary of State for Multilateral Affairs. The students outlined solutions to mitigate harm caused to the region by the changing climate, to reduce the carbon footprint of the people living there and to communicate these issues in innovative ways.

The Mekong River provides resources and services for 300 million people across Southeast Asia, but the ecosystem faces collapse from overfishing, unsustainable development and poor agricultural practices, according to Conservation International, an environmental nonprofit organization.

Recommendations for food, energy and water

At the beginning of the fall 2021 semester, the UArizona students divided into three teams to research and produce presentations to share with the State Department their research-based recommendations on three topics: food, energy and water.

The water team, which focused on the region's water quality, recommended installing new groundwater monitoring networks, expanding gender equity in water resource management, investing in flood disaster response and promoting eco-friendly farming practices.

"Going into the project, I knew vaguely about hydropower in the Mekong region," said water team member Jen Steyaert, a graduate student pursuing a doctorate in hydrology. "The lack of groundwater regulation in the region and its growing importance as a water source in the face of climate change really shaped our recommendations."

The energy team's goal was to improve the energy grid's resilience while reducing reliance on fossil fuels and hydropower. The team suggested investing in non-hydropower renewable energy projects, providing technical assistance for developing energy-efficient building codes, building on existing international collaborations in the region's energy grid as well as funding microgrants for businesses and individuals to upgrade to more energy efficient appliances.

"I worked with the energy team, and the recommendations we made reinforced something I was already aware of – that some solutions for climate change are political and not technological," said **Sam Myers**, a graduate student in planetary sciences. "Every recommendation we made was about providing funding for existing technology or communications to implement existing technology. It highlights how much these issues are political ... just having the technology is necessary but not at all sufficient."

The food team sought ways to improve land use, agriculture, small farmer sustainability and food security in the region. They recommended creating a climate mitigation strategy for the region's land, promoting climate adaptation education and farming sustainability, and implementing food fortification and nutritional education.

Genesis Martinez, an undergraduate studying molecular and cellular biology and biochemistry, said she was excited that she was able to apply her genetics background to her work with the food team to recommend ways to get more nutrition into existing food.

"I saw how my work could be tied into something unexpected, like food," she said.

The three teams also worked together on an information dissemination plan focused on reaching women, youth and local communities. They suggested the State Department use Facebook, YouTube, Instagram and TikTok to spread important information, share policy implementation success stories, develop awareness campaigns and more.

At the end of the presentation, Pak congratulated the students. She and the State Department will decide how and when to use the information the students shared.

"Thank you for your preparations, passion and research," Pak said. "Don't lose that passion and drive for excellence and data. I am incredibly impressed and appreciative about what you're doing, and I'm excited about your future and the Mekong River region's future."

The course instructors also applauded their students' performance.

"These students are really stretching," Garfin said. "They're going to their cutting edges because they're working on topics that they may not be an expert in, but they're doing it with a tremendous amount of dedication."

"This is the kind of work a science policy person is going to have to do in the real world," Lansey said. "They'll have to expand beyond their field. It's challenging for them, but it will give them more confidence when they finish up."

Even if their recommendations aren't implemented, the students agreed that it was a useful experience.

"It was useful to see how policy making works on that level," Myers said. "That's an experience you don't get in other classes or in volunteer activism or by reading the news."

Real-world experience with science policy

Students in the two classes included a mix of undergraduate and graduate students studying hydrology, neuroscience, astronomy, biochemistry, water policy, dendrochronology, architecture and more.

"The University of Arizona class was attractive because they offered expertise across the project's key subject areas combined with a strong focus on science diplomacy – that is rare among applicants to this program," said Scott Wicker, a National Academy of Sciences Jefferson Science Fellow with the State Department. Wicker works to connect the State Department's office regional strategies with academia. He led the Diplomacy Lab project request proposal development and coordinated with UArizona's faculty.

Lansey and Vafai chose the Mekong River Basin project because it was a policy project that had a heavy science focus.

"We wanted to get our students involved in real-world solution-making and recognize some career options they have in the long term," Lansey said. "The State Department is a place for scientists to go and maybe make a career of science policy. I think the students got excited about that."

Many of the students said that's exactly why they signed up for the class.

"Once I get my doctorate, I want to be in politics or science policy and need that background knowledge and experience," Myers said.

Steyaert, from the water team, said she has always been interested in science, but she'd like to focus more on putting that science into action.

Martinez, from the food team, said she would recommend her peers take the class.

"If you're not confident, this will provide exposure to variety of things you can do with your degree," she said. "This class experience was great for my communication skills. We often get bogged down in the details when talking about our research, but we can't do that when speaking to the general people. This class also built up my confidence in public speaking."

"I was really proud of this class and what we were able to accomplish together – undergraduates and graduates from all different backgrounds and fields of study – and we worked together seamlessly," said Shelley Littin, who is pursuing a master's degree in systems engineering. "Yes, it was classwork, but for the first time, this felt like we were also doing something with real-world impact."

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