



**METER**  
ENVIRONMENT

## REFORESTATION IN THE PHILIPPINES

In the mountainous Benguet province of the Philippines, farmers grow up to three crops of vegetables a year. Their mountain vegetable farms exist at the expense of original forest cover, causing tremendous erosion difficulties. To counteract erosion and preserve the watershed as well as promote reforestation, the Philippine government issued a mandate: farmers must find alternatives that restore the watershed or lose their land.

### AN AGROFORESTRY ALTERNATIVE

Loreca Stauber is no scientist, but she loves Benguet, and a letter from her friend, a scientist living in the Philippines, inspired her with the vision of teaching farmers to reforest the mountains and grow vegetables amongst the trees.

Her friend writes, “We envision mountain farms as forest ecosystems whose primary social responsibility to the communities around and below is to be part of responsible watersheds that court, catch, store and gradually share water. We see mountain farms that are not prone to soil erosion or leaching: cultivated with minimal chemical inputs and tillage that will allow the natural buildup of biomass, organic matter, helpful organisms and fauna. We think of forest ecosystems that may not make millionaires of its farmers for one generation and heavy debtors even before the next. Rather, we envision forest farm ecosystems that are self-sufficient and self-sustaining. We are working on demonstrating forest ecosystems that can substitute for monocrop vegetable farms that deplete and leach the soil, pollute watersheds and are self-destructing.”

Realizing the problem in the Philippines could be solved by reforestation, Loreca emailed Dr. Anthony S. Davis, Tom Alberg and Judi Beck Chair in Natural Resources in the University of Idaho’s Department of Forest, Rangeland, and Fire Sciences. The U of I operates a 100-year-old nursery specializing in growing hardy tree seedlings. Dr. Davis recalls, “The email she sent me said, “I think you should do something about this,” and I thought, “Actually I agree. I think we should do something about this. So we began to screen the idea, asking: are there partners? Is it a good idea? Does it fit with this little thing that we do really well, which is essentially teaching people how

to grow tree seedlings, and is there an educational component that's valuable for our students? When those checkboxes lined up, then it was a matter of taking advantage of that opportunity and seeing where it could go.”

## DETERMINING WHAT ALREADY WORKS

Together, they and other partners started a program in which U of I students went overseas to teach the people of Benguet how to grow trees, with the goal of moving the land toward agroforestry. They wanted to grow a forest ecosystem (trees, shrubs, and ground cover) along with annual crops. Kea Woodruff, former U of I Nursery Production and Logistics Associate, now at Harvard University, traveled to the Philippines with an interdisciplinary team of undergraduate and graduate students to look at what agroforestry projects were already working and to conduct a needs assessment. She says, “I saw a wide variety of landscapes in the areas that we were. One woman decided on her own that she was going to practice agroforestry, and people come and view her land as a demonstration site. It has mature bamboo, coffee trees, and mature Benguet pine. It really looks like what you would expect the native forest to look in an area like the Philippines.”

Kea said there were also intermediate sites where there are Benguet pines and some coffee with row crops blended in, such as strawberries and squash. She adds, “There’s clearly great potential to grow different species on these lands if we can help figure out the best way to use the resources that are available.”

## INSPIRING STUDENTS TO LOOK AT THE BIG PICTURE

One of the steps in helping local farmers to solve this problem is to create a local nursery where they can start growing native plants and trees. Fortunately, the University of Idaho has operated a tree nursery for over one hundred years, and they understand how to grow trees. Dr. Davis specializes in setting up native nurseries for growing native plants all over the world. He says, “I want our students to be exposed to this because we’re graduating students who should be problem solvers, who should be able to look at the biggest challenges and contribute their own ideas towards resolving those challenges.”

[Watch this short video to learn more](#)

Loreca Stauber adds, “We are part of the world and the world is part of us. The students can do more than just get their degree and find a job. Anthony and Kea, when they do this, inspire students to look at a bigger world than they are currently living in.”

## TRAINING STUDENTS TO UNDERSTAND NATIVE TERRAIN AND RESOURCES

Davis says a good plan needs to take local conditions into account: “The principles of growing trees are actually universal. It doesn’t matter whether you’re in Haiti, Lebanon, Idaho, or in the Philippines. Those principles are the same and they’re readily transferable. It’s how you adapt them to unique local situations that makes a difference.”

Kea Woodruff, former U of I Nursery Production and Logistics Associate, now at Harvard University, says they train the students who go overseas on the “target plant” concept: designing a growing regime based on what the plant is going to need in its future home. She says, “It’s not really about the best way to grow a plant in a greenhouse environment; It’s about the best way to grow a plant that will also survive on its outplanting site. Determining what the outplanting site is and what each species will need to survive on that outplanting site is what determines greenhouse operations.”

Dr. Davis says you need to consider native resources when doing these types of projects. “There could be plumbing there, but there’s no guarantee that when you turn the system on, the tap water will come out. That depends on the seasonality of the rains. It’s part of why we wanted the project partners (the farmers) to have data loggers: so we could look at the data together and get a better feel for when water is most abundant and when it’s most scarce, so it can be stored for later use.”



ZL6 data logger

## OVERCOMING NATIVE CHALLENGES WITH REMOTE DATA

METER donated [data loggers](#) to the program so that Dr. Davis and other people on the team could look at data with the farmers in the Philippines and advise them [when to irrigate](#). Davis says, “One of the things that’s most important in trying to set up a very remote nursery and manage the production in that nursery from approximately four flights, twelve hours, and twelve time zones away, is knowing what’s going on. There are things that are really easy to ask, like could you send me a picture every Wednesday and Saturday of the nursery, or could you measure the height and the diameter of the seedlings? What’s much harder to tell is how much water is coming in, or what the temperature was during the day or night, because those require people to be monitoring things at a greater frequency than is often possible. If we know how much water is coming into the nursery from rainfall, we can build collection systems so that we can manage where that water goes later on.”

Managing data for both the short and long term is critical, says Davis, because it’s often whether there was rainfall in the predicted amount, and at the right time, that determines whether a seedling establishes or not.

Discover METER [data loggers](#)