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Transcription of Sex and ecosystem services: the importance of gendered ethnobotanical knowledge in the Bale Mountains, Ethiopia, 4/23/2013

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[00:05 - 01:00] Matt Luizza: Perfect. Great. Thanks, Jill, and thank you all for being here today for coming out despite round two of the Snow Questor 2013, [laughter] as I'm calling it. Today, I'm going to be talking about some of the work that I'm doing in Ethiopia, and some of you might notice that the title is slightly changed from what the flyer advertise, which I always struggle with this with presentations, I always tend to change something last minute that shifts the name, but I kept sexing the title. As Jill noted, that is that curiosity alone probably brought a few of you out, and it is central to what I'll be talking about today. More specifically, the importance of gender distinctions and local ecological knowledge of plants in Ethiopia. So just to give you a little roadmap of where we'll be going on this brief, but hopefully magical time together is to introduce you to my CCC fellowship project. Which again was looking at cataloging women's knowledge, ethnobotanical knowledge in the highlands of south central Ethiopia. But the tweak that I've added is I wanted to show, share with you how this ties directly into my dissertation research, which is looking at this concept and calling integrative spatial modeling, which I adopted or rather blatantly stole from my co advisor, Paul who had coined this term in a, in a proposal. And I liked it because it really encompassed and encompassed everything that I'm interested in. My broad range of interests of looking at integrating, bridging these gaps between some key research disciplines that I am interested in, that I feel have a lot to offer one another, but tend to work in isolation of each other, including ecosystem services, adaptive governance, and species distribution modeling. And then finally, I'll briefly touch on the next steps.

[02:00 - 03:55] Matt Luizza: Where is this project going to work in Ethiopia? In addition to how this is playing into, again, my research focus in Alaska. But before I do that, I'm sure, I imagine some of you are not familiar with the Center for Collaborative Conservation, so I just wanted to give them a quick shout out and plug in a slide. The CCC is located Taos and the Warner College of Natural Resources here at CSU, and it's made up of, of a slew of rock stars, including director Robin Reid, associate director Kim Skylander, and an amazing staff, including Jill Lacock, who introduced me, Chaska Walkers here, and just a bunch of other great people. And as you can see, these blue on the map here, this all these blue dots show where CCC fellows have done research. And so the CCC is actively working across the globe, bridging activities and interests of the university with people and communities that are working to do collaborative conservation on the ground. So these locally driven efforts that are, that are sharing knowledge and providing action for these community based efforts. And so my cohort, which I'm a part of, is the fourth cohort. We're actually wrapping things up right now is the new cohort. Cohort five is coming in. Was made up of 14 fellows, including eight graduate students like myself, working across six countries. And each of our projects are, have been engaging or actively working to engage the goals and mission of the CCC, often in very, very different ways. So my project specifically is looking at, again, cataloging local women's knowledge of plants in Ethiopia. So why? Who cares? And there's a few reasons. I've, there's an array of research. First, that denotes the importance of integrating local ecological knowledge with more conventional scientific processes.

[03:55 - 05:58] Matt Luizza: And this research spans a lot of disciplines. And they use this term local ecological knowledge. But they may be more anthropology based researchers, natural resource managers. And I put a couple of, of sources that I particularly like here. But, I mean, the literature is chock full of these studies that show potential benefits of integrating this knowledge, whether it's providing a basis for better locally based economic development, whether it complements or even can validate conventional scientific studies, or at least provide better and more effective and legitimate co-management efforts between local resource users and natural resource managers. In addition to this, there's plenty of criticism of integrating local ecological knowledge, whether due to potential for co-optation of, of local knowledge, or also even more legalistic issues of intellectual property rights. But LEK is, this is a dynamic dynamic thing. And and a lot of the research shows how it varies across not only occupation, but gender, other socioeconomic, sociocultural, even biogeographical factors. And although this LEK integration is inherent or more so implicit to ethnobotany studies, the importance of this knowledge gender link tends to be overlooked. And I have a couple other authors that that point this out. Ethiopia in particular has a noticeable gap, when it comes to this knowledge. The importance of the knowledge gender link. So what I did first was a lit review, which a lot of people that are students here have done plenty of those. And I wanted to look

at how is the ethnobotany literature specifically addressing or not addressing this and looking across 46 years and four major ethnobotany journals, I found 39 studies that that focused on ethnobotanical surveys in Ethiopia. And over 80 percent, not surprisingly, as some of these other authors have noted, over 80 percent of the studies failed to make any distinction between men's knowledge and women's knowledge.

[05:58 - 07:47] Matt Luizza: Whether it was, they didn't even say what their sampling was, they only focused on men, or there was a really lopsided sample size of. We interviewed 100 men and two women. But in many cases, they start to then generalize to the broader community about the knowledge of, of these, of these plant uses or plant types. In addition to this, interestingly, other gaps came out of geographical biases. So the region that I'm working in and that the team, a whole team and many of them are here that have been working in the Barley region for a while. When it comes to ethnobotany studies, very few studies are in the south central highlands of Ethiopia or the south central region. And also areas like eastern Ethiopia bordering Somalia. There's few studies. They tend to focus cluster in particular regions. And lastly, what came out too is that 70 percent of the studies look only at medicinal plants. And so there's this another gap of understanding and cataloging a broad array of uses that could be important ecosystem services or benefits that people are deriving from these plants that's being missed. And this paper right here is by Reiner Bousman, who's from the Missouri Botanical Garden. He worked with, collaborated with some colleagues at CSU, and he worked in the same region that, that the group I work with did our study. But in 2011, looking at men's knowledge. So the other kind of push for doing this study through the CCC was to round out and say, okay, we've got, we've got for the same region the knowledge of plant uses by men. But what about women and how does this look? So the project location. We worked in two, two areas of the south central highlands, the barley region of Ethiopia.

[07:47 - 09:44] Matt Luizza: One is a town called Dinsho, which is just at the north end of the Barley Mountains National Park. So this is actually the park boundary. The protected national park and have the honour today of actually having one of the co-founders of this park here. And the other area is just east of the park. Was a hunting concession. There's two hunting concessions that we were visiting and doing vegetation sampling at that have villages adjacent to. And so we also interviewed women adjacent to one of these hunting concessions. And this region is fairly under-researched, but even Ethiopia more broadly tends to be under-researched. But it's, it's hugely important when it comes to not only biological diversity, but just human history. I mean, the narrow portion of the Great Rift Valley cuts through Ethiopia. This is where Lucy, Australopithecus, you know, three million years old, was discovered in the afar region. Even older pre-human remains have been found in northern Ethiopia. And again, we just don't have a lot of knowledge about, in many cases, the ecology of

some of these regions or, or even the cultures. And so this area is, has has a very unique elevational gradient, you know, ranges from its high elevation ranging from 1,600 to 2,300 m, bimodal rain patterns. So there's two dry seasons, two wet seasons. And here you can range anywhere from 70 to, you know, 1,200 mm of rain annually. And it has extremely unique flora, which comes in part out of the soil in the area which comes from ancient lava flows, you know, from the [unintelligible] over 33 million years ago. And so the soils here are these fairly low density, loamy, [inaudible] and salt soils that are characteristic of these lava outflows. And so the UNEP, the United Nations Environmental Program, notes that for the barley region, this area-

[09:46 - 11:47] Matt Luizza: That due to this sort of isolation, this unique mixture of of elevation climate has produced flora that is found nowhere else in the world. Biodiversity is another important part of the barley region. There are some rare and endemic species that are only found here, including spiral horned antelope and mountain Nyala, and the critically endangered Ethiopian wolf, which is only found in [inaudible] plateau which encompasses the study region. And that's my co-advisor Paul, who's having a little face off with a bull, Nyala. And I obviously took a much safer distance to document this. [laughter] But this area, and you can even see the lush, the lush vegetation that's here again, this unique unique setting. But this area is also threatened by population expansion linked with deforestation. Livestock grazing. Land use, land change for settlements that are encroaching in different areas. And this is a picture that was actually taken on a ridge overlooking. So this is the one of the protected hunting concessions. And then this is the border, the fence here. This is the border with one of the villages. And so, again, as UNEP and others have noted, this is, this is an extremely critical place for, for conservation efforts to be occurring. And furthermore, it's made more, more prevalent by the fact that these, this unique flora is utilized by local, by local resource users for an array of provisioning ecosystem services, or again, benefits that are derived from the ecosystem and consumed either by as fuel, fiber, food. And this is actually a beehive that I don't know what I'm doing in that, but and this is made out of an endemic tree species, [unintelligible]. And so people are reliant on, on this landscape for a variety of daily activities.

[11:51 - 13:38] Matt Luizza: Before I get into the specifics of the methods I want to, I first have to thank the team of people that I worked with in Ethiopia. Otherwise, none of this would have happened. Specifically, obviously, the women that agreed to participate in this, but I had an amazing team of, of Colorado-based and Ethiopian-based researchers that helped me. A couple of them are here today, including Heather Young, who works with natural with Larimer County Natural Resources, Nick Young, who works at the Ecology lab. Of course, my co advisor, Paul. We had, and in addition to that Christina [unintelligible], who's a doctor at the health center who helped with these

focus groups and especially for our Ethiopian team our, our tracker guide, translator extraordinaire [unintelligible], who this would have been nearly impossible without his help. What we did was we did two focus groups. A focus group in each of the locations that I showed you. And we took a plant picture database that was utilized by the prior study. I mentioned the [unintelligible] piece that catalogued men's knowledge of plants in the same region, and we modified it to create these picture ID photos that were, and this was almost, you could call it a rapid rural assessment. We were able to get through a lot of pictures in fairly short amount of time. Each focus group took about six hours. But we had 337 plants from the region, and we laid them out on tables based on functional groups. So whether it was tree, shrub, fern, herb and then the women were allowed to talk amongst themselves, walk around and pick up. And when they saw a picture of a plant they knew and recognized, they pick it up and hold it. And they would continue to walk around and talk with each other and pick up, continue to pick up pictures.

[13:38 - 15:45] Matt Luizza: And once everybody had picked up everything they knew and they just didn't recognize anymore, we cleared the table and put all those unidentified photos in a folder labeled unidentified, and then sat down and we discussed each woman went and we discussed the plants that they identified, what the local name was, the uses, and any and any, you know, more rich narrative stories attached to it. And from this from both of these focus groups, we were able to then create these plant derived ecosystem service categories, which we had 15 total. And with the women's contribution, we had one new unique category that men hadn't identified, which was cosmetics. So plants that were used for either piercing ears or, or, you know, for aromatics or other things. And from this between the two focus groups, 181 plants were identified, and interestingly, medicinal and veterinary uses made up 86 percent of the, of the identified uses, and this alone hold the implications when we, when we talk about conservation and cataloging local knowledge. Because these ethnobotany literature tends to focus, when they're looking at medicinal plants on traditional healers. And traditional healers tend to be mad. So those are the people that are usually interviewed in a lot of these studies. But the women, local women had, had an array of knowledge about medicinal uses of plants. Additionally, other, other uses, they, they had a lot of knowledge about honey production. So plants that provided pollination services, which again, the the use of the honey honey production tends to be a man's job in barley region. And so this this alone was, you know, some, some fascinating findings right up front. A couple of interesting plants that came out of this. Just to give you an idea of some of the uses that were brought up, just includes Schefflera volkensii or volkensii, Ansha and or Mifa, and it's a tree that can be found in Ethiopia, also other sub-Saharan African countries.

[15:45 - 17:32] Matt Luizza: And this had three interesting uses that were identified by the women, including medicinal. And so what the women were saying when a when a new mother gives birth, the leaves of this tree are boiled and then the body of the, the new mother is wash with the leaves. And it's not only to cleanse her, but also to keep her warm. And then a linked use is a spiritual ceremonial use. The same, you know, boiling leaf, part of leaves. The new mother inhales the vapors, and that's supposed to expel any evil spirits that might harm the mother or the baby. And then finally, they even noted that cattle like it too. They eat the leaves. And a second one. A second uses the grass of Paspalum species, which this picture is actually not from our database. I didn't have time to find it. I looked it up. And this has, this is actually not even the subspecies I don't think that they have in Ethiopia, but it looks similar. And it's a tall perennial that grows throughout sub-Saharan Africa. And interestingly, it's also found throughout the US. And some sources have said they believe that the transmission of of some of the subspecies of Paspalum came over from Africa on slave ships because some of the subspecies are turf grass and it was actually used as bedding on the slave ships. But this particular species that was identified in barley was used for medicinal uses and, interestingly, only for snakebites. And the women were adamant that only special healers can do this. So they pull out the blade of grass. The special healer chews on the the edge of the of the, where the root of the grass is, and then spits on the snake, spits that back out onto the snakebite. And it's supposed to, um, speed up the healing of that of that wound.

[17:35 - 19:32] Matt Luizza: From the study, from this initial, initial foray into into Ethiopia of getting to know the community, not only do we find these really interesting trends in women's knowledge, unique knowledge of plants, but I think most importantly, what came out of this was, we started to see this process was empowering for the participants. And this has implications for collaborative community based conservation as well. When we initially showed up, we, the women thanked us, especially, especially the women in Dinsho, thanked us for coming out and teaching them about plants. And we made it very clear right away that they were the teachers for the day, and that we were happy to learn from them about their knowledge of plants and that dynamic, that shift right away was was noticeable. They were animated and excited and very detailed and forthcoming about uses, stories tied with it. I mean, we gained a wealth of knowledge about changes they're seeing, and rainfall patterns and the you know, the inability to now predict when the rainy season or dry season will start and end, to just very personal stories about these plant uses. And I think what's key for this, too, is that in both cases, there was some existing trust, social capital that was already built before we got there. Otherwise, I don't know if this rapid approach of coming in and doing this would have worked at all, especially for the women in Dinsho. We had the benefit of working through a local non-profit, [unintelligible] Foundation, and had the benefit of having these women picked through a Micro loan program, which two of our audience members were critical critical in that. So,

thank you guys again for your contribution. And so the women were much more comfortable in this process. And additionally, some of the most important, I think, insights and potentials for gauging the desire for collaborative conservation in this area was the fact that this process reawakened for some of these women.

[19:32 - 21:24] Matt Luizza: One one individual noted that they tend to inadvertently split, when they look at plants in nature as separate from humans and livelihoods, and just the process of them teaching us about plant uses. Plant names reawaken that connection or the need to preserve that. And so they came up with some really exciting future prospects of pooling money through the Micro loan program to buy land outside of the town, grow medicinal plants to sell at the market. And they were really excited about the idea of, of us coming back in the future and having a workshop where they would, they would talk, they would teach girls, young girls in the community, relay their knowledge about plants and uses, in addition to doing these landscape walks to, to keep that knowledge alive, which was exciting, which was really exciting for us. And, you know, just from this first initial trip. [pauses] So now to transition a little. How does this play into my, my research, my dissertation research. So what I'm looking at is this or calling Integrative Spatial Modeling. And what this ISM approach is hoping to do is to mix these qualitative and quantitative approaches from social and natural sciences. At the ecology lab, we do a lot of species distribution modeling. And when integration is brought up, what it tends to mean is that you're integrating a lot of different geospatial platforms into one type of model. For this, what we're what we're hoping what I'm hoping to accomplish is bringing more of, again, the integration of the local ecological knowledge and actively engaging communities as local knowledge is not static. It's always changing and evolving. And the three the three disciplines that I feel have a lot to offer one another but don't tend to, they tend to work in isolation from each other, is Ecosystem Services, Adaptive Governance, and again, the Species Distribution Modeling.

[21:24 - 23:25] Matt Luizza: And I could talk ad nauseam about where all these gaps are. But just to be brief, Ecosystem Services literature, we had a great distinguished lecture here recently for GDPE. Taylor Ricketts, who's renowned for his work with Ecosystem Service mapping model and he lamented the fact in one of his talks that in many cases, the Ecosystem Service literature fails to connect the local user, the local benefactor, to the actual service that's being assessed or theorized about. And that, in many ways is the same with, with the Species Distribution Modeling literature that in many cases and there are some there are few exceptions, uh, notable exceptions in each of these literatures that Species Distribution Modeling, which holds extremely important implications for conservation planning, natural resource management, tends in many cases to not engage local communities, at least about their knowledge in an active and engaged and continuing long term way.

And Adaptive Governance, which, you know, Ecosystem Services is is very intuitive, very poorly understood concept, but it's attempting to deal with sort of the messiness that's inherent with social ecological systems. And that messiness, in many ways requires these adaptive, flexible frameworks or institutions for addressing environmental issues and Adaptive Governance, which one of the mechanisms that's spoken about a lot is knowledge integration being critical. In many cases doesn't empirically test a lot of these mechanisms. So again, this whole Integrated Spatial Modeling approach is looking to how do we how do we get these three very important, uh, important frameworks to talk to one another and create, create hopefully ultimately a robust methodology for, for not only adaptive governance of invasive species, which is what I'm focusing on for my dissertation, but being able to govern Ecosystem Services more generally with the community involved and address other, other disturbance drivers beyond invasive species like climate change, population increase.

[23:26 - 25:22] Matt Luizza: And so the four components which, which I'll show in the next few slides, how the Ethiopia, how I've been kind of gauging and calibrating this through the preliminary work in Ethiopia. I focus on these two components. Haven't gotten really to the next steps yet. But first, understanding the nuances of local resource user valuation of these plant derived ecosystem services. And, and in this case, the next step is what we decided to do is I took the, the rich data that was collected with the women in Bali just this past December, and then compared it with the men's data of plant uses and identification to see if there are some stark trends and differentiations in how how what people were using plants for based on gender and also how they were valuing those, those sources. Second component being to then model the suitability of habitat for these, you know, extremely important culturally, economically and ecologically significant service providing species. And so I did that with three plants that were chosen and again, very preliminary modeling attempts. But-, and finally, you know, the next steps, which will be coming down, down the pipeline, is providing this unique platform for assessing the vulnerability of these important service providing species to-, in this case, for my dissertation work in Alaska focusing on invasive species. And many of the same methods will be used for identifying what is an invasive species, talking with the local community to define those parameters and what are the targets, the conservation targets, but also what are the most pressing drivers, the community feels are threatened in those services. And then finally, and most importantly is that throughout this iterative process, local resource users are actively engaged and local knowledge is not static. And it's always changing and will always be vetting this process with the community.

[25:25 - 27:22] Matt Luizza: And this is again the similar what I kind of stated, but in a more colorful way. We started with this qualitative data model of this local ecological knowledge integration,

cataloging and assessing local knowledge of resource users. From here, this data, which is used to define the important conservation targets we used moved into the quantitative model of, of taking presence data that was of, of these species of interest that were collected in the field, not only by my colleagues at the ecology lab from prior visits to the barley region, but also we spent about 21 days in the field collecting additional vegetation data this past trip and then using environmental predictor variables pulled through GIS computations or remotely sensed imagery. And this, you know, this includes different information, including slope, aspect, elevation, and different different derived indices, including, you know, enhanced vegetation indices. And then finally, this data is then plugged into a modeling framework. In this case I use maximum entropy. And what the model does is it extracts that environmental data from those presence points. And then using a statistical algorithm, it then applies it to produce these mapping outputs of suitability of habitat along the gradient, which you can see here. The hotter colors going to red predict more suitable habitat, the cooler colors less. And so what it's doing is it's saying based on these points, we know that these are the environmental variables or at this point and extrapolates that across the landscape. Then the key distinction we're hoping to do then is now taking this data back to the community to not only get a dialogue going about once looking at these maps, validate the maps with local community members, but also get a dialogue going about collaborative conservation.

[27:23 - 29:22] Matt Luizza: So this- I would have to say my favorite response to this graph is yours, Dave. When you saw that Dave saw this graph, he said, you know, sometimes you don't need stats to make your point. And this, when we put this together, this was really interesting to see that. So the red is the men's. The data from the men's study in the same region from 2011, compared with the women's data from, from this past December. And right off the bat, some stark things jumped out, including, you know, how men are were identifying, you know, 5 or 6 times more forage providing plants in addition to, you know, firewood, you know, three times as many construction plants that provide important construction materials. But then we started to see that women then were equally identifying at higher levels, other services provided by, in some cases, the same plant or different plants. In this case, you know, we have this unique category that no men identified- cosmetics, but then also women identified much more spiritual and ceremonial uses, as well as about twice as many veterinary, twice as many medicinal and more, surprisingly more honey production related plants. So from, from these talks, we also in addition to talking during the focus groups with the women, we talked with some local men just to have more informal engagement. We started talking about plants that are important for whatever reason, for whatever uses to people and, and consistently some of these three came out. And so I decided to test this process of Integrated Spatial Modeling out and run some models, the first one being Hagenia abyssinica or Heto in the local language or Mifa. And Hagenia not only provides medicinal properties, it actually combats

tapeworm. It's made into either a tea that's drink or it's the-, or the flowers are crushed up and put in food and it combats tapeworm.

[29:22 - 31:43] Matt Luizza: But it's also an important source of construction material. And also for honey production. The, the beehives that you saw earlier are they climb up into these trees and put them at the top. In addition to these other two trees, Hypericum or Garramba, or Mifa and Juniperus or Hindesa. Both of these are also medicinal, and they're actually the leaves of both are combined to create a medicinal tea that combats, that alleviates flu symptoms. But both are also important for construction. More so, the juniper and then Hypericum also has pollination services attached to it. And so these, these three user defined targets were then run through the model. So the field data was collected through these modified Whittaker plots, which are with our group at the lab extensively uses these nested plots that allow you to sample at different intensities. And it's been shown to be very effective in predicting abundance of different species across the landscape. And this is where the presence data of each of these trees was pulled from. And then an individual model was run for each tree and then the output, this is the output for each one. And then through ArcGIS the rasters of these outputs or the distribution, the suitable habitat of each tree was then added together to create this final medicinal tree suitability hotspot model, which the red shows where all three species were predicted to have suitable habitat. The orange, where two species were predicted to have suitable habitat and the yellow were only one. And then where there's no colour, that was no prediction of suitable habitat for for those species. And again, this is just the trial run of the model where, and I'm already seeing where, you know, next steps of running more iterations on this, where the data, the output tended to be fit around the few because we had very few presence points. The data tended to be fit around that. But the next steps is then to take this model, continue to continue to run iterations on it, but also bring it back to the community to start this dialogue about, you know, potential areas of conservation and implications.

[31:45 - 33:04] Matt Luizza: So, the next steps again is to validate and calibrate with local resource users to get this dialogue going, but also to the next step of implementing this ISM approach. For my research beginning in Alaska this summer, which will hopefully be the focus of my dissertation looking at invasive species. But will, you know, we've talked I've talked with the team of our lab about, you know, the future prospects of going back and continuing this dialogue with the same women, expanding and actually enacting some of these ideas that that were brought up by the local community themselves, including this more environmental education component with, with local, with local girls, and continuing to expand the collection of, of this dynamic local knowledge and then finally begin that final component of the ISM methodology of adding this Invasive Species Vulnerability Assessment and the work in Alaska. So, thank you for your time. I just want to again

thank, you know, my project collaborators here in Colorado, in Ethiopia, as well as the CCC as well as NIFA, who pays for my school and, and my co-advisors Michelle Betsill and Paul, for their continued feedback and, um, putting up with my email bombardments every other day asking questions. So thank you guys. [applause]

[33:04 - 33:04] Speaker 1: Any questions tonight? [long puase]

[33:21 - 33:43] Matt Luizza: Perfect. Airtight [laughs]. Well thank you guys. And if you do have think of other questions you know before you leave, feel free to talk to me or want to exchange emails if you're working on similar things. By all means, let's chat. Oh, and then this is the second to last of these. But there's one is are you going to-

[33:43 - 33:44] Speaker 1: In two weeks.

[33:44 - 33:44] Matt Luizza: Two weeks?

[33:44 - 33:44] Speaker 1: Yeah.

[33:44 - 33:45] Matt Luizza: That is another one.

[33:45 - 33:46] Speaker 1: Yeah is that our last one [inaudible].

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