Project Updates: December 2021

Research protocols and permits

This project has been impacted by the COVID-19 pandemic. As COVID-19 cases decreased in the project region, we were able to obtain all the permits to conduct field research. We developed a strict COVID-19 protocol to be implemented in the field. We obtained approval from the University of Arizona Institutional Review Board (IRB) on 9 November 2020 under the protocol code 2011181447 and amended it on 1 July 2021.

The process to obtain approval from the Indigenous Communities included: a) letter of approval from the Indigenous communities (before the trip); b) Free-Prior and Informed Consent (FPIC) (during fieldwork); and c) individual meetings with community leaders (during fieldwork).

Survey Implementation

The survey followed the recommendations provided by Dillmann et al. (2014) and Vehovar and Manfreda (2008). The survey was conducted in the Spanish and Guarani languages. Guarani is one of the Indigenous languages spoken in the region. We used an open-ended question and the Best-Worst Scaling method (Figure 1).

Open-Ended question: What are the most important forest benefits?

Best-Worst Scaling:

In the following list, what are the most and least important forest benefits?

Most Important		Least Important
○	Food	○
○	Wood, firewood, charcoal	○
○	Medicinal plants and/or for crafts	○
○	Recreation and/or spiritual/religious values	○

Figure 1. Example of the Open-Ended and Best-Worst questions for identifying relevant ecosystem services.

We collected 139 surveys distributed among five stakeholder groups: Indigenous communities A and B, residents of Bahia Negra, cattle ranchers, and decision-makers/NGOs. We discarded three surveys during the analysis.

Survey Results

Table 1 shows the most important forest ecosystem services within each stakeholder group. The most important forest ES were food (24%), wood (14%), and firewood (13%) for Indigenous communities A and B, residents, and cattle ranchers. For both Indigenous communities, 35% of the participants mentioned that food (provisioning) is the most important forest ES; however, for residents and cattle ranchers only 14% and 13% respectively listed food as important. For these two last groups, wood (provisioning) was the most important forest ES with 25% and 20% respectively.

Table 1. The most important forest ecosystem services within each stakeholder group are based on the total number of times mentioned.

Ecosystem service category	Ecosystem service	Indigenous community A (n=36)	Indigenous community B (n=10)	Residents (n=72)	Cattle ranchers (n=8)	Total (n=126)
Provisioning	Food	35%	35%	14%	13%	24%
Provisioning	Wood	6%	4%	25%	20%	14%
Provisioning	Firewood	18%	19%	7%	7%	13%
Regulating	Oxygen	4%	4%	14%	13%	9%
Provisioning	Raw materials for crafts	10%	19%	2%	0%	8%
Provisioning	Honey	18%	12%	0%	0%	7%
Regulating	Climate regulation	0%	0%	12%	7%	5%
Supporting	Habitat for animals and plants	3%	4%	7%	7%	5%
Provisioning	Food for cattle	0%	0%	0%	13%	3%
Provisioning	Medicinal Plants	3%	4%	3%	0%	2%
Supporting	Flora	1%	0%	5%	0%	2%
Supporting	Fauna	0%	0%	7%	0%	2%
Regulating	Climate protection for cattle	0%	0%	0%	7%	2%
Regulating	Air quality maintenance	0%	0%	0%	7%	2%
Regulating	Fire regulation/protection	0%	0%	0%	7%	2%
Cultural	Recreation	1%	0%	1%	0%	1%
Supporting	Biodiversity	0%	0%	1%	0%	0%
Regulating	Soil thermoregulation	0%	0%	1%	0%	0%
Cultural	Scenic beauty	0%	0%	1%	0%	0%

We separately analyzed decision-makers as we used the Best-Worst Scaling to collect data. For this group, the most important forest ES is flooding and erosion control/habitat for animals (regulating and supporting, BWS score = 0.45). On the other side, the least important forest ES are wood, fire, and charcoal (provisioning, BWS score = -0.4250), and recreation and spiritual/religious values (cultural, BWS score = -0.4250).

Dissemination of Results

We presented our preliminary results at the University of Arizona Tinker Roundtable Session 2 on 5 November 2021. The title of the presentation was "Identifying synergies and tradeoffs between ecosystem services and development." The online presentation can be found here.

Figure 2. Presentation at the Tinker Roundtable session 2 flyer

Next Steps

We plan on finalizing the data analysis and start writing a scientific paper to disseminate our results. We also plan to prepare a report in Spanish for the Indigenous Communities and do another trip to the field to socialize the results with them.

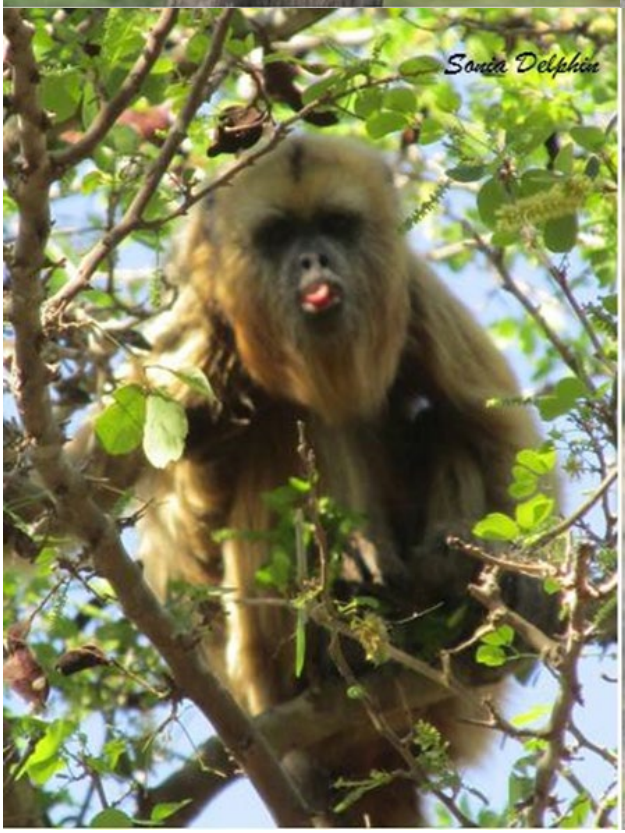
Photo 1. A survey conducted at the Indigenous community B in July 2021. Photo 2. A survey conducted at the Indigenous community in July 2021.

Photo 3. A survey conducted in the Indigenous Community A. Photo 4. Individual mapping consultation to identify ecosystem services hotspots.

Photo 5. Typical Indigenous house in the project region.

Photo 6. Handicrafts made by Indigenous women

Photos of wildlife and plants: During fieldwork, I was very lucky to see many wildlife species and I want to share some of the photos.

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