

Can indigenous peoples be relied on to gather reliable environmental data?

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No one is in a better position to monitor environmental conditions in remote areas of the natural world than the people living there. But many scientists believe the cultural and educational gulf between trained scientists and indigenous cultures is simply too great to bridge -- that native peoples cannot be relied on to collect reliable data.

But now, researchers led by Stanford [ecologist](#) Jose Fragoso have completed a five-year environmental study of a 48,000-square-kilometer piece of the [Amazon Basin](#) that demonstrates otherwise. The results are presented in a paper published in the October issue of [BioScience](#) and are available online.

The study set out to determine the state of the vertebrate [animal populations](#) in the region and how they are affected by human activities. But Fragoso and his colleagues knew they couldn't gather the data over such a huge area by themselves.

"The only way you are going to understand what is in the Amazon in terms of [plants and animals](#) and the environment, is to use this approach of training indigenous and the other local people to work with scientists," Fragoso said.

"If I had tried to use only scientists, postdocs and graduate students to do the work, it would not have been accomplished."

Fragoso and his colleagues worked in the Rupununi region in Guyana, a

forest-savanna ecosystem occupied by the Makushi and Wapishana peoples. They support themselves primarily through a mix of subsistence hunting, fishing and agriculture, along with some [commercial fishing](#), bird trapping and small-scale timber harvesting.

The researchers recruited 28 villages and trained more than 340 villagers in methods of collecting field data in a consistent, systematic way. The villagers were shown how to walk a transect through an area, recording sightings and signs of animals, noting the presence of plants that animals feed on and marking their observations on a map.

The training was not without its challenges. Many of the older villagers were expert bushmen, but could not read, write or do arithmetic. Many of the younger villagers, who had received some formal education, were literate but lacked knowledge of the animals and plants in the wilds around their communities. So researchers paired younger and older villagers to go into the field together. All the villagers were paid for the work they did.

Part of any scientific study is validating the accuracy of the data and Frago's team knew that no matter how well they trained their indigenous technicians, they would have to analyze the data for errors and possible fabrications.

The researchers used a variety of methods, including having a different team of technicians or researchers walk some transects a second time, to verify that they were regularly walked by technicians, that data were accurate and that reported animal sightings were plausible. They also had technicians fill out monthly questionnaires about their work and did statistical analyses for patterns of discrepancy in the data.

The most consistently accurate data was recorded by technicians in communities that had strong leadership and that were part of a larger

indigenous organization, such as an association of villages. Fabricated data was most common among technicians from villages unaffiliated or loosely affiliated with such an association, where there was less oversight.

The other main factor was whether a technician's interest in the work went beyond a salary, whether he was interested in acquiring knowledge.

After all the data verification was done, the researchers found that on average, the indigenous technicians were every bit as able to systematically record accurate data as trained scientists. They were also probably better than scientists at detecting animals and their signs.

"This is the first study at a really large scale that shows that consistently valid field data can be collected by trained, indigenous peoples and it can be done really well," Fragoso said. "We have measured the error and discovered that 28 percent of villages experienced some data fabrication. This originated from about 5 percent (18 out of 335) of technicians fabricating data, which may not be much different than what occurs in the community of scientists."

"The indigenous technicians are no more corrupt, sloppy, or lazy than we are," he said, noting that every year papers published in peer-reviewed science journals have to be withdrawn because of falsified or inaccurate data.

In all, the technicians walked over 43,000 kilometers through the wild, recording data. That's once around the world and then some. They logged 48,000 sightings of animals of 267 species. They also recorded over 33,000 locations of fruit patches on which various species of animals feed.

Working with indigenous technicians enables researchers to gather far

more data over a much larger area than would otherwise be possible, Frago said. Such data can be used by governments, scientists and conservation organizations to get an understanding of remote areas, from tropical forests to the Arctic tundra.

Fragoso is optimistic about how the results of the study will be received by the scientific community.

"I have presented this study to some pretty unreceptive groups, such as at scientific meetings, but by the end of the presentation audience members are either convinced, or at least they doubt their argument, which is a major achievement in itself," he said.

"One thing about the scientific community – if you have enough solid data and the analysis is well done, there is very little you can argue against."

Provided by Stanford University

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