edited by Tiffany Ayers

BIODIVERSITY

Scientists Engage Mexican Residents in Conservation Efforts

Making maps in the dirt, drawing pictures, and using piles of beans may not seem like the typical tools a scientist would use to measure the effects of human population on a biodiversity reserve. But scientists in the Mexican Yucatan are finding that a method known as participatory rural appraisal (PRA) helps create a dialogue about population and land use and involves local residents in conservation efforts.

A study in the Calakmul Biosphere Reserve, conducted through a partnership between the World Wildlife Fund (WWF) and Pronatura Peninsula de Yucatan and coordinated by Jenny Ericson, a University of Michigan Population-Environment Fellow, examines migration and land-use planning in the communities bordering the reserve. The research will then be used to help establish a low-cost population monitoring system, as well as an appropriate land-use planning process that takes into account both social and ecological issues.

The study is part of the AAAS Program on Population and Sustainable Development's (PSD) International Research Cooperation Project (IRCP), which allows scientists to study population and biodiversity in protected areas in eight countries around the world. The IRCP, a 3-year project which began in spring 1996 and is funded by The John D. and Catherine T. MacArthur Foundation, recognizes that for protected areas to be preserved from the threats of population growth, tourism, and wasteful production practices, the people in those areas must be brought into the conservation efforts.

The Calakmul Biosphere Reserve is one such area where conservation gains could be threatened. The reserve, which was established in the state of Campeche on the Yucatan peninsula in 1989, covers 723,185 hectares—the largest tract of protected tropical forest in Mexico. It is home to precious hardwoods such as mahogany and Spanish cedar, and endangered animals such as jaguars, howler monkeys, and spider monkeys. However, the land borders the territory of some 114 pre-existing communities, with an estimated population of 25,000 that continues to grow with migration and natural population growth. Residents practice agriculture, forestry, and cattle-ranching. Also, recent infrastructural developments have included a large-scale water project, a number of paved roads, and an air strip.

The residents come from different regions, most having arrived during the last 20 years from the states of Tabasco, Veracruz, Michoacan, and Chiapas. They are divided along ethnic, religious, and family lines. Most speak Spanish, some are bilingual, while others—especially adult women—speak only the language of their ethnic group, primarily Chol and Tzeltal. Most have little to no education.

Such factors could make a scientist's research difficult. But PRA helped Ericson to tap into the history, economy, and culture of the population, while at the same time enabled the people to participate actively in the research process.

The PRA method is being used by more and more scientists around the world. "PRA started as a populist and peripheral method little accepted by the research and development community, but it has increasingly been accepted by development practitioners," said Mark Freudenberger of WWF. "It's a qualitative research method, and does not claim to be like classical surveys that obtain high degrees of precision. But it uses triangulation of different sources of information recounted by different interest groups to minimize bias and reduce errors of interpretation." The PRA method is less expensive

SOURCE: JENNY ERICSON

Residents in the Calakmul Biosphere Reserve participate in recording data about their community.

Fishing for Facts

In Kenya, David Obura, a scientist at the New England Aquarium, is working with local residents to gather information for biodiversity mapping for coral reef conservation. Under AAAS/PSD's International Research Cooperation Project, Obura is adding a human population dimension to his research on the coral reef features in Galu and Kinondo in Kwale District, south of Mombasa.

Obura met with local fishermen to describe the objectives of the study and its significance for them. He accompanied them in their canoes, recorded local geographic names and locations using a global positioning system (GPS), and asked them about their fishing habits. "I want to find out what they know about coral reefs," Obura said.

"Fishing is typically done from dugout canoes," Obura said in a project report to AAAS. "Notes are made on waterproof slates for transfer later into a detailed notebook, with a GPS in a waterproof pouch. ... Questioning is generally in Swahili without an interpreter."

One of Obura's most difficult tasks was to gain the trust of the fishermen. Many of them fear that conservation efforts will result in the loss of fishing access. "Work at each new landing site has necessitated up to 4 weeks of negotiations, meeting the appropriate elders and 'beach chairman,' " Obura said.

Obura is now asking the fishermen to record data about their catch. The men record the names of the fishermen, the sites they fish, the type of gear they use, and the number of different fish they catch at each site. "The data reflect their view of the fish, not mine," Obura said.

Obura is using a method known as participatory learning and action, which grew out of the participatory rural appraisal method. The method will allow the fishermen to determine what their problems are—whether it is overfishing, marketing, access to freezers, or transportation—so they can seek solutions.

"It's been very slow, trying to get into their thinking and see what they think their problems are," Obura said. But hopefully, the fishermen will be able to use the data they help Obura collect for long-term conservation gains.

than extensive surveys; it does not rely on the purchase of computers and statistical analysis materials. And the PRA method does something the classical survey cannot: "PRA creates an interactive dialogue between people and researchers," Freudenberger said.

Bean Counting

Ericson assembled a team that included herself, four people who have lived in the region since the early 1980s, and a woman social anthropologist of Mayan origin from the state of Yucatan. The six-member team was trained in the use of PRA by the University of Yucatan, Grupo DIP. "It was our first bonding experience," Ericson said. "There had to be a solid sense of trust among team members for this methodology to be successful."

The team then visited three communities located around the reserve, spending 14 to 21 days residing in each community. "We took our hammocks and brought in lots of food. We hired a local woman to cook for us, because employment opportunities are very limited in these communities," Ericson said. "We got permission from the local leader of the community to stay in a house—in one case, an old schoolhouse."

The team spoke with members of the community about the families that had come and gone in the area, how many children families had and what family planning methods they used, and how the families lived, whether from agriculture, logging, or government subsistence. The fact that some of Ericson's team members were from the communities themselves helped the team to discuss openly these topics with the people.

The information gathered was then recorded by people in the community and members of the team with hand-illustrated maps, piles of beans representing proportions, and diagrams. "Activity clocks" show the hour-by-hour daily household activities of the residents and their relationship to the land. A "migration diagram" shows how the first settlers came to the area, and uses arrows and dates to describe how families have come and gone since. And a "history chart" tells of droughts, animal populations, and immigration of people.

Getting Results

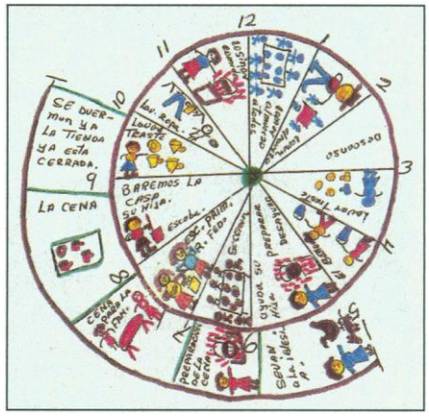
The final information and illustrations gathered by Ericson's team were compiled into a book, which was approved by the community before it was handed to outside groups. The original document remained in the community for them to use to discuss their own history and future plans. "The real objective is empowerment," Ericson said. "They can do what they want with the information and they now have knowledge of new tools that can be used to express themselves."

Ericson said it is difficult for residents to picture a long-term vision of how to conserve resources when they are confronted by immediate pressures to produce sufficient food and income for household survival. She hopes, however, that the research will help get them to think about creative solutions for their future.

"We supported this project because it combines population and biodiversity data—an integral approach that is critical, yet not often used," said Victoria Dompka, AAAS's PSD director. "We hope that this type of research will serve as a guideline for other scientists in the field."

The method worked for Ericson. She said the oral histories she obtained with the PRA method were "the most important part of the work and the most precious."

SOURCE: JENNY ERICSON



An activity clock shows the daily tasks of a woman who lives in the Mexican Yucatan.

EDUCATION

AAAS ENTRY POINT! Interns Visit Hill

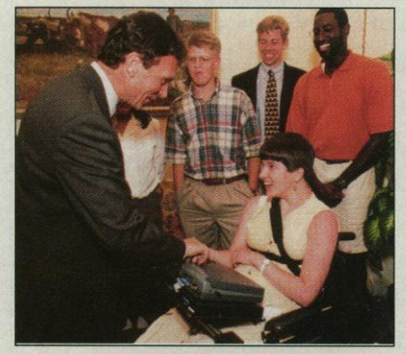


PHOTO: DAVID SCAVONE

Sen. Daschle meets ENTRY POINT! interns.

AAAS ENTRY POINT! interns at the National Aeronautic Space Administration's (NASA) Goddard Space Flight Center in Greenbelt, Maryland, toured Capitol Hill and met with U.S. Senate Minority Leader Tom Daschle (D–SD), other members of Congress, and staff members of the Senate Subcommittee on Science, Technology and Space in July. The ENTRY POINT! program provides summer internships for graduate and undergraduate students with disabilities pursuing technical careers. In summer 1998, ENTRY POINT! placed 46 students from 37 colleges at 8 NASA sites, 10 IBM locations, Dupont, and UNUM America, an insurance firm in Portland, Maine.

MEMBERSHIP

New AAAS Dues Rates Approved for 1999

The AAAS Board of Directors approved a dues increase for 1999. The Board authorized increases to cover two kinds of expenses: unavoidable costs associated with running AAAS and publishing *Science* and new expenses that add value to membership. Postage increases and developing new features for *Science* Online and other electronic products are examples of the kind of new expenses the Board anticipated in setting the 1999 dues rates.

The new rates are effective for terms beginning after 31 December 1998. As listed below, they do not include postage for international members, which is additional.

- Regular professional members $110
- Postdocs and K–12 teachers $87
- Emeritus members who receive *Science* $75
- Students $62
- Patrons $250
- Corporate $1000
- Spouses and supporting and emeritus members who do not receive *Science* $48
- Libraries and institutions $325

Full-text *Science* Online will continue to be available to members receiving *Science* at $12 in addition to dues. Special procedures are being developed for site-wide online access for libraries and institutions based on IP address. Librarians should contact AAAS or their catalog agents for pricing.

All members whose membership expires during 1999 will be advised of the new dues rates on their renewal notices.

Member dues and voluntary contributions form the critical financial base for a wide range of AAAS activities.

For more information, contact the AAAS Membership Office at 202-326-6417.