

ECOLOGICAL RESEARCH AND CONSERVATION POLICY IN MEXICO

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A fundamental challenge for ecologists is "to devote part of their professional lives to stemming the tide of environmental degradation and the associated losses of biodiversity and its ecological services" (Bazzaz et al. 1998). As environmental degradation proceeds at a rampant pace, the role of ecologists has become more and more relevant, and this is particularly true in developing countries.

When I began working as a researcher at the Institute of Ecology of the National University of Mexico in 1989, I decided to dedicate an important part of my career to linking my ecological research with what I perceived were some of the most pressing environmental issues in Mexico--habitat fragmentation and the loss of biological diversity. During the past 15 years I have been involved in many projects, including but not limited to (1) establishing the first private reserve decreed as a National reserve (the Chamela-Cuixmala biosphere reserve), (2) enactment of Mexico's endangered species act, which protects thousands of species at risk of extinction, (3) establishment of the first conservation easement fund, which pays peasants to protect 80,000 ha of tropical forests in the Calakmul region in southern Mexico, (4) the first eradication of introduced rats on an Mexican island (Rasa Island), (5) the first reintroduction of an extirpated mammal (the black-footed ferret, *Mustela nigripes*), (6) evaluation of the effectiveness of the System of National Protected Areas, and (7) study and management of species as diverse as jaguars and prairie dogs (e.g., Ceballos & Navarro 1991; Ceballos & Garcia 1995; Ceballos et al. 1993, 1998; Ceballos & Ehrlich 2002). Among the more practical issues in which I have participated are environmental impact assessments, ecological zoning of critical habitats such as the dry forests in Acapulco, and legally challenges to unsound environmental projects such as the "inter-channel" way, a 1.2 billion dollar project that had the potential to disrupt the ecosystems of the Laguna Madre in northeastern Mexico.

Linking ecological research with conservation issues has provided me with some of the most challenging yet rewarding times of my life. I will briefly discuss here a few general lessons that I have learned during my career to date that may be useful for young ecologists starting their careers both in Mexico and elsewhere.

First, it is important to emphasize that Mexico is a megadiverse country estimated to contain approximately 10% of living species. In some senses the biological diversity of the country is truly remarkable. For example, it is one of the top five countries in species richness of vascular plants and of vertebrates such as mammals and herptiles. Levels of endemism are high, often similar to those of island countries, ranging from around 10% for birds to more than 60% for amphibians and some groups of plants (Mittermeier et al. 1997).

However, like most countries, Mexico faces extremely difficult environmental problems arising from global and national economic, political, and social issues. Major drivers of environmental degradation are a growing human population and a pervasive social inequity in the distribution of wealth. It is estimated that 50% of the 100 million Mexican people live at or below the poverty line. Optimistic scenarios indicate that the population probably will stabilize around 130 million sometime this century. In the meantime, faulty and corrupt development policies that lack an environmental perspective have caused the almost complete obliteration of entire ecosystems such as the tropical rain forest, the extinction of thousands of populations and species, and the loss of environmental goods and services. These losses have in turn been reflected by declines in human well being and in a rapid trend towards poverty.

The need for solid ecological research to provide guidance to different sectors of society for sustainable development is clear (Castillo & Toledo 2000). But getting involved in conservation issues in Mexico, as in many other countries, presents profound obstacles for ecologists. I will mention what I consider the most relevant. First, as surprising as may seem, the academic evaluation system at universities, research institutes, and the National Science Council do not have proper mechanisms to evaluate and reward conservation activities. Indeed, getting involved in conservation issues is still regarded as negative by some academic groups. Second, ecologists usually are poorly trained to address research on conservation and to understand the complex social and economic issues related to conservation practice, which limits the impact of their involvement in conservation (Possingham et al. 2001). Third, science in general and environmental research in particular are poorly funded, which is a basic problem for long term studies and projects.

But getting involved in conservation policy and practice can offer outstanding professional opportunities for an ecologist. I have three major pieces of advice for getting involved in conservation. First, one must be aware of the prevailing rules if one works in an academic institution. In my case, I learned that I could succeed in my academic evaluations if I published in good journals, so publishing results became a basic part of my conservation activities. In many cases, I choose to work on conservation problems that also would be interesting from the perspective of my ecological research. There are plenty of opportunities to follow this kind of approach. Second, I learned that in order to be effective in conservation one must collaborate with experts in other areas of ecology and resource management, as well as other disciplines such as economics or law that can help to address complex conservation issues in proper technical, social, and political frameworks. In my case, for example, working with Dr. Alberto Szekely, a prominent environmental lawyer in Mexico, has allowed me to be effective in political arenas that are beyond my expertise. Finally, I learned that although in ecology we work with high uncertainty, both solid ecological data and analysis are powerful inputs for influencing environmental decision-making.

The involvement of ecologists in conservation practice and policy in Mexico has been extremely useful and productive. Ecologists working with specialists in other topics have been able to revolutionize the way the environment is perceived in Mexico. Much remains to be done, but since 1988, the government has enacted many laws and acts, such as the general law for environmental issues, the endangered species act, and the National Protected System, and has created the Ministry for the Environment, the National Commission for Biodiversity, and the National Commission for Protected Areas. Due to these efforts the future looks a bit brighter.

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- Gerardo Ceballos received a 2004 Distinguished Service Award from the Society for Conservation Biology for his leadership in ecology and conservation worldwide, with special emphasis on protected areas and environmental legislation in Mexico and Austral and Neotropical America.