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Partnerships, Not Projects! *Improving the Environment Through* *Collaborative Research and Action*

Diane E. Austin

The knowledge we can obtain through direct experience is often only a fraction of what is necessary for understanding our interactions with the environments upon which we depend. We often know little about the environmental impacts of agricultural practices, water projects, or oil extraction activities that supply what we want and need. Knowledge gaps are exacerbated by technologies that enable the mobility of people and resources. Those who act to fill the information gaps wield tremendous power in defining cause and effect, problems and solutions. This article describes a particular model of developing partnerships for community-based research and action that seeks to address the gaps and then provides an example of the model's application.

Key words: collaborative research, partnerships, community-based research, U.S.-Mexico border

One of the key features of recent environmental policy in the United States is the decentralization of decision making from national to local levels. This is a positive step in the administration of resources, but this trend holds danger as well as promise. For decades, environmental issues have been treated as the purview of experts. National environmental legislation governs air, water, waste disposal, and more. In the 1980s, Congress began enacting legislation, such as the Hazardous and Solid Waste Amendments to the Resource Conservation and Recovery Act (RCRA), that was

specifically designed to force federal agencies to take action to increase environmental protection. High costs associated with such legislation, political backlash, and other factors have resulted in increasing decentralization of decision making and devolution of authority back to the local level.

The rationale behind decentralization is that local people know best what their problems are and how to solve them. In the face of major environmental change, this assumption must be carefully examined. While there is considerable local knowledge about the problems—be they coastal erosion, aquifer depletion, air pollution, or radioactive contamination—it is another matter to assume that local knowledge about the environment is necessarily relevant to their solutions. Many of the problems communities now face stem from large-scale environmental change caused by decisions made far away. Levees on the Mississippi River, dams constructed on its many tributaries, and subsidence and canal dredging associated with the oil and gas industry all have contributed to the extensive coastal erosion experienced by residents of southern Louisiana's bayou communities. Many southwestern aquifers have been drawn down to the point where subsidence is causing buildings to collapse, and wells must be drilled ever deeper to reach potable water. Groundwater is supplemented by water transported via canals hundreds of miles across the desert from the Colorado River and its tributaries.

Rapid urbanization has occurred in the Mexican border communities that are the hosts to maquiladoras, the foreign-owned assembly plants first organized in the 1960s under Mexico's Border Industrialization Program and expanded in the 1980s and 1990s under policies such as the North American Free Trade Agreement (NAFTA). The maquiladoras

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have attracted many workers to the border, resulting in rapid population growth in areas without adequate infrastructure. Problems such as vehicular traffic on unpaved roads and parking lots, burning of wood and garbage, and deforestation and subsequent erosion all contribute to high levels of airborne particulate matter. Transferring decision making about such problems to local leaders and residents places responsibility and some control on their shoulders, but it does not grant them authority in the arenas where the decisions that create these problems are made. Nor does it provide the financial or technical resources adequate to address them.

Such problems are deemed environmental, but they reflect failures in dominant economic, social, political, and value systems. They emerge from environmental change of a nature and scope that renders existing knowledge, whether “traditional” or “scientific,” inadequate and requires decision making under conditions of complexity and uncertainty. And these problems are predictably catching the attention of applied anthropologists: they are the result of human action; they are linked to human and ecosystem health; they are disproportionate in their impacts; and they are manifest at local and global scales. Of particular concern is that those who benefit from activities that result in environmental damage are often far removed from the impacts. For example, many of us benefit—often unknowingly—from natural resource manipulation and exploitation, whether that be the construction of river levees to reduce sedimentation in coastal marshes, depletion of groundwater for agricultural production, damming of rivers for power generation, extraction and production of oil and gas, or proliferation of maquiladoras that provide consumer goods for U.S. markets. National and international discourses of need, threats, and lack of alternatives, coupled with silence about local impacts of development policies, create challenges for those trying to understand human-environment interactions and address environmental problems. However, none of us—indigenous leaders, peasants, urban dwellers, scientists, or religious prophets—have traditions that instruct us how to meet these challenges.

Operating within an environment where there is incomplete and imperfect knowledge, and where shared understanding is lacking, those who seek to define cause and effect, problems and solutions, wield tremendous power. We are surrounded by evidence of how this power is exercised, both directly and through the discourse that defines both problems and solutions. In the midst of obvious and significant problems, together with taken-for-granted explanations of cause and effect, and the ever-decreasing resources available to address problems that have important health and ecosystem consequences, the pressure to find quick fixes is great. As social scientists seeking to challenge definitions that lay blame on the less powerful and support actions of those with power, we face daunting hurdles.

Understanding and then addressing these problems require simultaneously recreating relationships between humans and the environment that supports us, among sectors of our societies, and between local actors and distant policy

makers. In the process, we must confront issues of knowledge construction, ways of learning, and social and cultural change. Thus, learning and action go hand in hand in our challenge to “muddle through” as we accept uncertainty and resist the promise of quick fixes. Though details will differ from one community to the next, we can discover larger frameworks that help us to understand patterns and connections among issues. To begin, we need long-term partnerships that recognize and support community ownership of the problems, definitions, and paths for improvement.

Such partnerships will start locally with problems that are observable and for which residents and leaders can imagine solutions and then build outward. Still, even at the local level the challenges are tremendous. This article offers a framework for developing such partnerships that draws upon philosophies and theories of learning and the foundation they provide for a particular approach to community-based research. It then describes one application of this approach. Two central elements of the approach are developing pilot projects to address specific local problems and moving outward to engage in larger debates and explore systemic issues. In this process, attention is paid to local, regional, national, and international policies—both formal and informal—and how these policies limit or facilitate problem solving and the search for effective means for tackling complex issues.

Community-Based Research as a Tool in Multisectoral Partnerships

Increasingly the role of groups and teams as a catalyst for change in environmental management is becoming well accepted.... However, to foster a more collective approach to environmental management that is capable of transformational change, we have to do more than just work together on specific projects. Transformational change requires individuals and groups to develop the capacity to move beyond the completion of task-bounded activities. They must catalyze change within their immediate membership first, and spread that culture to others in their communities over the longer term (Allen, Kilvington, and Horn 2002:6).

Environmental problems can be recognized within the broader context of late 20th and early 21st century concerns. Central to the debates over social change has been a revitalization of the notion of civil society and especially the role of nongovernmental organizations (NGOs) in creating, maintaining, and transforming it. Civil society refers to that segment of society that exists beyond the household and outside of the state and marketplace; it interacts with and influences the state and yet is distinct from the state (Chazan 1992:281). Of concern regarding

the idea of civil society—and related concepts such as “empowerment,” “partnerships,” “participation,” and “community involvement”—is that this discourse and its attendant programs can involve poor citizens in providing (formerly public) services, thereby extending strapped budgets stretched yet thinner by structural adjustment

programs, and involving people in their own self-management (Paley 2002:482).

Related but distinct from discussions of civil society are calls for structured interaction among the various sectors of society, specifically government, business, academia, and NGOs.

[C]ross-sector collaboration today is required not only to tackle complex public problems that no one sector can handle alone, but also to better understand and redefine the relationships and strategies of [government, business, and nonprofit organizations].... Some of the most interesting and constructive collaborations are occurring in regions, where government, business, and non-profit leaders are working out practical ways of dealing with their common problems (Fosler 2002:1,6).

Partnerships are perceived to be able to respond to several problems: high levels of complexity, low levels of public confidence in institutions, and insufficient capacity within a single organization to go it alone. Success is attributed to establishing and maintaining relationships of mutual benefit, identifying and working toward a common purpose, developing effective group process, and demonstrating effectiveness through performance. At the same time, critics have expressed skepticism over such partnerships, especially when they involve groups with vast differences in size, resources, and power (see Austin et al. 2004 for a review of elements of successful collaboration). At least one observer has called on anthropologists to pay attention to "how complex sets of relationships among various kinds of associations, the agencies and agents of the state, and individuals and communities have had an impact in specific locales at specific times" (Fisher 1997:442). This article responds to and repeats the call to focus on partnerships and their impacts rather than either the constituent organizations or projects. It describes an approach to developing community-level partnerships and the evolution of one such partnership in which university students and I have been involved for three years.

Community-university partnerships are not new. Students and faculty in engineering, business, medicine, education, and other disciplines have traditionally developed relationships with businesses, medical facilities, schools, and other entities through which students learn and community partners receive benefits. In recent decades fresh attention has been focused on partnerships, especially in what have been termed marginalized communities (Polanyi and Cockburn 2003), with the explicit purpose of integrating learning and social change and fostering civic participation. Collaborative community research for social change has a long tradition in applied anthropology, from Sol Tax's action research of the 1940s structured to develop and test theory through experiments with collaborative research in the 1980s (Schensul and Stern 1985; Stull and Schensul 1987). Yet, few models have paid explicit attention to organizing research to maximize learning, and those have generally been restricted to educational settings (e.g., González 1995; González et al. 1995; Stringer 1997; Watahomigie and Yamamoto 1987).

Recent trends in increasing campus-community engagement, which have found support at both the liberal and conservative ends of the political spectrum, have focused new attention on collaborative community research, learning, and especially the involvement of students in the process. Applied anthropologists and their work have been largely absent from these discussions, however. Recent publications cite few, if any, anthropologists (for exceptions, see Farquhar and Wing 2003, citing Thu et al. 1997, and Fawcett et al. 2003, citing Stull and Schensul 1987 and Tax 1958), and anthropology has been absent from projects such as the American Association for Higher Education's 19-volume series on service learning in the disciplines (http://www.aahe.org/service/series_new.htm).

Applied anthropologists have important contributions to make to this latest iteration, both in developing and in assessing projects and programs in communities. A recent issue of the *Michigan Journal of Community Service Learning* (Vol. 10, No. 3, 2004) devoted to anthropology and service learning and the recent popularity of sessions on community-based learning and research at both the Society for Applied Anthropology and American Anthropological Association annual meetings indicate that change is occurring.

Within the spectrum of community-university partnerships, community-based research (CBR) has evolved from traditions of participatory and action research, popular education, and empowerment research, and it provides an excellent foundation for partnerships within which environmental problems can be addressed (the Summer 2003 special edition of the *Michigan Journal of Community Service Learning* is devoted to community-based research; see also Minkler and Wallerstein 2003 and Strand et al. 2003a, 2003b, for a general introduction and discussion). Key Freirian concepts such as *praxis* (reflection in action) and *conscientization* (the process of coming to understand the reality of oppression and becoming active in its elimination) are particularly valuable where the goal is to help learners recognize both their ignorance and their tacit support of existing ideologies and power structures that serve to perpetuate the problems (Freire 1970, 1974).

When addressing the types of environmental problems being discussed here, the learners include also members of groups, such as engineers and scientists, who have not typically perceived themselves or been perceived as oppressed. Yet, as products of educational systems that narrow learning and prevent the so-called educated from reaching the understanding necessary for effectively addressing problems, these learners, too, must come to recognize their subjugation and what is necessary to eliminate it.¹ In the face of tremendous challenges, the production of knowledge must be seen as the right and responsibility of everyone (see Gaventa 1993).

In this context, where all must take the perspective of learners and look beyond the obvious for the roots of problems, CBR provides a framework for learning and reflection in action. Key tenets are to foster collaboration among community members and researchers (including students), engage all in

reflective practice and reciprocal learning, build the capacity of community groups to create change, balance research and action, practice inter- and multidisciplinary work, and situate community concerns in a larger context (see Minkler and Wallerstein 2003; Strand et al. 2003a, 2003b; and Stoecker 2003). Proponents of community-based research, and the related approach known as community service learning, laud not only the service but also the improved learning outcomes derived from engaging students in meaningful application of academic concepts. While advocates of both approaches pay attention to pedagogy, the advantages of CBR include a focus on a culture or community of learners, as opposed to individual learners, and explicit examination of relationships of power (Cooks, Scharrer, and Paredes 2004). Well-integrated programs that incorporate a social justice pedagogy are more likely to foster perspective transformation in the moral, political, and intellectual domains than programs that offer students isolated experiences (Eyler and Giles 1999).

Much of the development of CBR has occurred in health and education; however, this paper examines the approach in the context of environmental issues where, as stated above, the nature and scope of problems render all of us ignorant. In this context, I argue that we need both action, combined with reflection, and mechanisms through which we can expand our limited knowledge. At the heart of the approach is the use of projects to build partnerships. Rather than the goal, the projects are the vehicles through which we identify our strengths and weaknesses and develop trust, confidence, and direction. The approach is designed to begin with a particular issue that is fairly well-defined and about which most people can agree and move from that to other, more challenging issues, accommodating new partners in the process. In this way, the overall partnership will pass through project-specific phases of collaboration many times and may be in more than one place at any given point in time. Individuals create partnerships. They utilize personal relationships (strong ties) to establish networks that then expand and set in place across disparate members the weak ties that enable interaction to occur (Granovetter 1973, 1982).

The partnership itself will evolve through stages defined here as: 1) initiating the partnership; 2) sustaining the partnership through ongoing assessment and change; 3) expanding membership and the scope of the partnership; and 4) reinforcing effective networks. Central to the approach, critical elements include conducting initial and ongoing assessments of both issues and participants; finding common ground; discovering, engaging, and meeting the needs of multisectoral partners; using pilot projects as opportunities for learning and identifying new issues; matching social organization to pedagogy; managing growth; and expanding to larger issues as appropriate. While we might fear that partnerships will get stuck in a never-ending cycle, addressing small, resolvable problems without moving to more complex issues, at least some partners will realize that the same problems keep recurring and require resolution at a different level, and they will lead the group forward. If adequately prepared, sufficiently

engaged, and trusted, we can and should be among those who play that role. The following example will illustrate the approach.

A Partnership in Nogales

The model described above has formed the basis for my participation in a multiyear, binational, multisectoral partnership in Ambos Nogales, which translates as “both” Nogales and includes Nogales, Arizona, and Nogales, Sonora. Nogales, Sonora, is home to approximately 300,000 people and abuts the city of Nogales, Arizona, with a population of just under 21,000. The two cities were established as railroad towns in the late 1800s, and their initial growth followed the railroad along the valley floor (Zonn 1978, cited in Arreola and Curtis 1993:208). During the 1920s, the shipment of Mexican produce to the United States became Nogales’s leading industry. Nogales remains a major border crossing for produce entering the United States. Stimulated first by the Border Industrialization Program of the 1960s and then the rapid industrial growth of the 1980s, the population of Nogales, like that of other Mexican border cities, has grown rapidly during the past several decades.

We can identify four phases through which individual partners pass in collaborative relationships (after Doughty 1987 and Murphy et al. 1987): 1) a time of getting acquainted and developing relationships; 2) a period of close cooperation when basic research and innovation occurs; 3) a period of consolidation and productive coexistence when the relationship becomes less intense but more long term; and 4) a final period of termination. Now in the third year of the Nogales partnership, representatives of some partner organizations have changed and relationships between various partners are in different phases of collaboration. While many are in a period of consolidation and productive coexistence, others are still at the phase of close cooperation. A few have been terminated because some groups were no longer gaining benefit from their association with the partnership. Key to the success of the partnership has been its flexibility and deliberate rejection of any formal, bureaucratic structure.

Situated in a particular context and based on specific relationships among and present needs of partners, each partnership is unique. The context for Nogales partnership is the U.S.-Mexico border, where problems are rooted in a long history of relationships both internal to each country and between the two countries. Communities are affected by international policies—for industrial development and environmental protection—and are distinguished by rapid growth, migration from throughout Mexico and beyond, lack of adequate infrastructure, and rapid environmental degradation. Despite recognition of the interdependence of its people, economies, and environments (see, for example, Kopinak 1996; Staudt and Coronado 2002; Vélez-Ibáñez 1996), the border region—distant from the national capitals of both nations—is understood more as a line separating the two countries than as an ecological, social, or cultural region.

The urban area of Ambos Nogales is located at the juncture of the Sonoran and Chihuahuan desert ecosystems within the Santa Cruz watershed, susceptible to drought and seasonal monsoon floods. Interconnected, binational environmental problems include poor air and water quality, deforestation, water scarcity, inadequately managed hazardous waste, and groundwater contamination. This ecologically coherent system is nevertheless divided by an international border that brings nations with vastly different economies and power into direct contact and affects the system's functioning.

For example, water in Nogales, Sonora, comes from the Santa Cruz River and interbasin transfers from basins south of the city. Governed by the Agreement on Cooperation for the Protection and Improvement of the Environment in the Border Area (the La Paz Agreement), signed in 1983 by the United States and Mexico, wastewater is collected, albeit incompletely, in Sonora and piped to an international treatment plant located north of the border (see www.municipiodenogales.org/hidrologia.htm). One consequence of Nogales's rapid growth is that the volume of wastewater often exceeds the capacity of the facility, leading to water quality problems downstream in Arizona.

On the Sonoran side, problems are associated with the continued loss of water via the movement of wastewater across the international border. Though treated effluent equal in volume to that of the wastewater coming across the border legally belongs to Mexico, no infrastructure exists to return it there. Significant barriers inhibit the development of such infrastructure, not the least of which is the need for right-of-way permits from several U.S. entities. Instead, the effluent downstream from the plant supports a lovely riparian habitat for the endangered Gila top minnow and many bird species, creating an area that has become attractive to tourists as well as local home owners (www.ibwc.state.gov/html/nogales.html). The popularity of the riparian region increases resistance to proposals to return water to Sonora, rather than release it into the river basin downstream of the treatment plant.

Water is only one of many potentially volatile issues in Ambos Nogales that must be approached carefully. A first principle in creating partnerships is to begin with issues that pose little risk to any of the partners and, as trust builds, expand to address more challenging questions.

Stage 1: Initiating a Partnership

Though I became involved in discussions about environmental justice with Nogales, Arizona, residents in the mid-1990s, my first official work there was to organize and manage a team to conduct a household and small business assessment of hazardous waste for the Nogales, Arizona, city environmental engineer, as part of a pollution prevention program (Smith et al. 1997). My involvement grew when I was asked to evaluate the potential for revegetation as a means to address air pollution, especially particulate matter (dust). That request came from the same individual, then the

Arizona Department of Environmental Quality border team air outreach coordinator and liaison to a binational, intergovernmental subgroup of the Border Liaison Mechanism.

The Border Liaison Mechanism was created by the U.S. State Department to prevent and solve border incidents and adopt strategies for protecting the safety of persons along the border. The University of Arizona, located in Tucson, lies within the Santa Cruz watershed, approximately 60 miles north of Nogales. In spring 2001, after an unsuccessful attempt to obtain new research funds, I recruited a group of university students and a teacher and students from an ecology club at the Centro de Estudios Tecnológicos industrial y de servicios No. 128 (CETis 128), a preparatory high school in Nogales, Sonora, to help conduct the assessment in exchange for the opportunity to learn together.

The results of our assessment indicated that even small increases in vegetation could reduce hill slope erosion, deposition on city streets and walkways, and generation of dust, and that local residents and community leaders were interested in participating in revegetation projects, though many lacked information and experience. Even more important, people felt their community had seen enough assessments and wanted to see action.² The combined interests of community members and educators, university faculty, and students in long-term engagement from which tangible results would emerge created a unique opportunity to explore new territory. A series of discussions and planning sessions led to the formation of a partnership that initially included one or two representatives of institutions of higher education, primary and secondary schools, maquiladoras, small businesses, government agencies, and nongovernmental organizations. Today, the partnership, which was named the Asociación de Reforestación en Ambos Nogales (ARAN³; Ambos Nogales Reforestation Partnership) in 2003, includes more than 20 organizations in the educational, governmental, business and industry, and nongovernmental sectors and provides the framework within which new initiatives can develop.

From the beginning, those of us who were involved in its initial development recognized that, to be sustainable, the revegetation partnership would have to meet—and continue to meet—the needs of all partners. We began with three pilot projects—a schoolyard habitat in a primary school, a green area/park in a local neighborhood, and a nursery at a local high school—all initially on the Sonoran side of the border. All projects were politically “safe” and could be supported by all sectors. They complemented environmental education efforts by the participating nongovernmental organizations and the tree giveaway campaigns⁴ led by local maquiladoras and city governments. Ultimately, we would get to larger issues such as preventing deforestation, assessing and addressing air quality on a larger scale, and protecting the watershed, but first we needed to build trust and develop a process for decision making around issues for which there was shared understanding and a low cost for failure.

After the first year of the pilot projects, university students conducted evaluations of the partnership, interviewing

partners from various sectors and organizations. When asked why he was involved in revegetation projects, a manager of a local maquiladora, who was also active in a local organization of environmental engineers and industrial hygienists from various businesses in Nogales, Sonora, responded by saying, simply, "My children live here." A teacher volunteered right away that she never imagined that students from her school would be working with those from another local school, explaining that the schools are considered "enemies" because students are loyal to their schools and feel a sense of competition. The teachers originally thought that they would not be able to work together but discovered that they were all working on the same types of projects and that they could continue doing the same work and participating together in ARAN.

Stage 2: Maintaining the Partnership through Ongoing Assessment and Change

As soon as we began to implement projects, compromise became necessary. For example, city officials and others wanted us to plant drought-resistant, native species that would not create new problems. Their concern stemmed from experience with eucalyptus trees and cottonwoods. Eucalyptus has been called the politician's tree because it grows fast and in the past had been given away by newly elected government officials to produce demonstrable results for constituents. But it ultimately cracks foundations and prevents other species from growing. Cottonwoods are native to washes throughout the region but are inappropriate in most arid, urban settings because of their high water needs. The group decided to plant only native, drought-resistant species.

Challenges arose immediately. In one case, university students worked with teachers, parents, and students at the primary school to design a schoolyard habitat that would include only native species and incorporate water harvesting. However, none of the selected species were available from local and government-run nurseries. They then had to choose between bringing the plants from the United States, which would require permission from customs officials and violate a policy that partners would acquire or purchase everything locally, or use nonnative species. Though local residents have developed numerous mechanisms for transporting goods across the border, as a multisectoral partnership, our aim was to work within the legal systems of both countries and to change—rather than ignore—barriers. The initial compromise was to use adapted but nonnative species acquired in Sonora, and this stimulated plans to help the city develop its nursery.

Another group of students worked with residents in a local *colonia* (neighborhood), where the preferred tree for the park was locally adapted and available but not native, and where the city's promise to provide water for the drip irrigation system reduced residents' concerns about water and the need to plant drought-resistant species. At the same time, a group of engineering students from the technical college formed a club and asked to join the partnership. They

persuaded the college administration to dedicate a plot of land to their group and wanted to begin by planting roses, a water-intensive, heat-susceptible species. After spending time with other partners, they selected more appropriate plants for their site.

Through the pilot projects, local residents saw visible action and identified unanticipated problems. In effect, the pilot projects served to extend the initial rapid assessment as university-based participant observers continued to gather data in their fieldnotes and project logs. Monthly partnership meetings became a forum where partners could share findings and devise strategies for action.

The pilot projects showed partners and others what was possible, and they led to the formation or reorganization of school and community organizations to focus on revegetation and environmental issues. A teacher commented that the role of ARAN is to show by example that these projects can work, and then people will approach and ask for help. Since the school's club has started working in the community, she has had friends approach her and ask for help to establish a green area and a schoolyard habitat for a kindergarten class.

During an evaluation of the program, a high school student participant said she sometimes hears people talk about how youth are important because they are our future, but she thinks youth are the future and the present. She and her peers are working to develop habits and values that are good for the environment. The ecology club used to be primarily about picking up trash, but through the students' leadership, the club began to have a much broader perspective on environmental issues. "ARAN provided an opportunity for students in the ecology club to get support from University of Arizona students, and at the same time, CETis students have helped other schools, like CONALEP and Covarrubias."⁵

Regular attention to the social organization that supports the partnership has been critical to its success. Shortly after the partnership began, someone approached the group with a proposal to include representatives of all schools in Nogales, Sonora. During the first year when the initial pilot projects were underway and we were learning how to work together, we agreed to involve no additional partners. The group used the time to establish a structure that now accommodates new members. Each partner established its own internal organization and mechanism for interacting with others. Procedures for prioritizing new projects to be undertaken by the group as a whole, proposed by a colonia resident, are now being developed.

Participants come to the partnership with knowledge and skills in some areas and not in others. Long-time residents remember certain tree species that once grew in the community; however, drawdown of the aquifer has changed local environmental conditions so that some can no longer exist without constant support. Because Nogales attracts residents from all over, many have little background or experience with Mexico's arid north. Also, sociopolitical conditions are always in flux. Recent maquiladora closures—due to the general economic downturn, exacerbated by the events of

September 11, 2001, and furthered by the relocation of plants to interior Mexico and China—led to an estimated 32 percent reduction in the maquiladora work force between February 2001 and May 2003 (*Twin Plant News*, May 2003). This has also resulted in changing priorities for the technical schools that had been established to supply the local workforce. Likewise, changes in Mexican migration patterns and U.S. border policies affect the region and the group's operation.

In the midst of constant change, a central concern has been building upon enthusiasm and interest while confronting a lack of shared knowledge and perceptions. We combine learning through experience with deliberate educational interventions. With several experienced teachers in the group, we have active discussions of pedagogy and approaches to learning. Our approach combines social constructionism, Lev Vygotsky's scaffolding (we learn most effectively from others one step ahead of us on the learning ladder), and Paulo Freire's praxis (reflection in action). This is not the only approach; however, we recognize that creating effective learning communities requires us to consciously attend to pedagogy and to matching strategies with expected outcomes. For the primary teachers, we organized a tour of successful and unsuccessful schoolyard habitats so the group would know what was required to develop and maintain a habitat as well as how to incorporate habitat activities into their curriculum.

We arranged for a trip to the Arizona Sonora Desert Museum, and special presentations on ecology, native plants, and plant propagation, for a group of engineering students. They then decided to plant saguaros, the centerpiece of the museum's lesson on ecology but a species that does not grow in Nogales's colder winter temperatures. In response, we encouraged an educational specialist at the Desert Museum to develop a special program on the unique habitat of Nogales, which is now available at the museum and for classroom presentations. We have also organized visits to an organic farm and composting facility, a native seed farm, the Tucson Botanical Gardens, and the Community Center for Conservation in San Lazaro, Sonora. Junior high, high school, and college students have shared their work and learned by participating in other local and regional conferences.

We also learn by doing. At first, participants expressed little interest in water; the groups were focused on learning how to make things grow and most had access to a source of water, at least initially. But in the summer of 2002 the city of Nogales, Sonora, ran out of water, which had to be obtained from Nogales, Arizona. When water was no longer available at one of the schools, the students carried water from home to water their trees. When the students no longer had water at their homes, their trees died. Following the dry season, the monsoons hit the community in full force; several people drowned, trapped in the city's storm water runoff channels. And due to development upslope, a huge channel was cut through the partners' neighborhood park. Water then got everyone's attention, and we organized workshops and developed new pilot projects.

Unlike revegetation, water—its source, use, and ultimate discharge—is recognized as a political as well as an ecological issue. For example, when a group of partners were meeting with state and federal officials about a municipal reforestation campaign, they raised the question of water. The government officials tried to tell them that the campaign was about reforestation and that water was an issue for the public works department, but the residents refused to let the issue go away. They insisted that provisions for water be included in the reforestation plans. The partnership, in this respect and many others, has enabled us all to see things differently. Combined with observation and reflection, and when operating on small pilot projects where the cost of failure has not been too great, direct experience has been an outstanding teacher.

One area that emerged as a significant issue for the neighborhoods was obtaining legal title to the land upon which the parks (known locally as green areas) were being developed. This was necessary to ensure that the land would not be sold or appropriated by another entity after the work had been done. City officials initially issued a three-year agreement for the park in the pilot project, but the title was given to the technical college rather than the residents. Efforts to change the title and establish a mechanism through which residents can gain title to the green areas have been ongoing.

Maintenance of the partnership has been accomplished through hands-on projects, regular meetings, deliberate attention to the addition of new members, workshops and field trips to fill knowledge gaps, and active discussions of pedagogy. These activities, combined with the willingness of all partners to learn, reflect, and compromise, have served the objectives of CBR: to foster collaboration, build local capacity, balance research and action, and begin to place community concerns in a larger context.

Stage 3: Expanding Membership and Scope of the Partnership

Despite the success of the partnership in accomplishing individual projects, it took time for the group to address larger issues, such as those that lead to deforestation, erosion, and the lack of native plants for revegetation. The partnership was organized to address reforestation, but as we structured its member organizations to support long-term participation, our objectives expanded to include improving the environment, fostering leadership, and strengthening the local knowledge base. Local interest in and concern about revegetation has been linked to concern over garbage and general environmental quality. Within the past year, members have participated in cleanup campaigns, evaluated tree survival in giveaway programs, and contributed to the development of a city nursery. Active participation by a new city administration has opened dialogue on topics such as garbage and wood burning and the lack of enforcement of environmental regulations, as well as bringing to the forefront the question of title to neighborhood green areas.

In response to an interview that was conducted as part of a study of civic participation in multisectoral environmental initiatives in Nogales, one of the teachers who had been among the original partners remarked that she did not think ARAN had had to make any difficult or important decisions yet. "Up to this point, the partnership hasn't had any money, but when we do, the decisions will become more difficult." She was confident that "When we do, we'll all be able to come to an agreement because our goals are the same. When that time comes to make an important decision, everyone will have a vote." When asked what she thought the goal of ARAN was, she said, "To improve the environment." Her observation proved to be prophetic.

Through the partnership, we are engaged in an ongoing cycle of exploration and discovery as the solution to one problem leads to the identification of another. Recently, ARAN was awarded a large grant from the United States Environmental Protection Agency's Border 2012 program to establish a central city nursery in Nogales, Sonora, and satellite nurseries at schools on both sides of the border. The grant also includes the initiation of a coordinated, binational environmental education campaign, five new green areas, and a public outreach program involving local health promoters and environmental organizations. At one point in the application process, we were informed that we would receive only half the money requested. Open negotiations over the budget forced us to confront the realities of inequality between the United States and Mexico and among the participating sectors. We had to simultaneously deal with ecological, social, and political issues. In the end, after two meetings and hours of discussion, at which my principal role and that of one of the university graduate students was to serve as facilitators, we reached a compromise and emerged with increased trust, a clearer understanding of our priorities, and a greater sense of unity. Ironically, immediately following the second meeting, I returned to my office to find a call informing me that the funding agency had come up with enough money to fully fund the project! I spent the next couple of days in phone conversations and meetings with project partners to share the good news.

During an interview for the study on civic participation, a former city official from Nogales, Arizona, reflected on the partnership,

One strength is that it serves as a model, because people inside organizations often do not see how their work inspires others. In turn, they are not inspired themselves and are not pushed to take on more. [The university partners] are able to look at the big picture and put together the little pieces. I am not sure if some of these projects are sustainable without the U of A [University of Arizona], but I do not necessarily think that is a bad thing. Communities have the choice of whether or not to take up these projects. Because students need hands-on experience, I do not think that the partnership with the U of A [should be terminated]. There are benefits both to the communities and to the U of A, creating a mutual dependence.

During the spring of 2004, partners engaged the mostly Anglo environmental community north of the border. The various groups that make up this community have organized to challenge development, protect the riparian region of the Santa Cruz River, and promote bird watching. Few have had much interaction with Mexican or Mexican American residents of the region. A commonly accepted notion—both spoken and unspoken—is that Mexicans are the source of most of the environmental problems in the region and care little about the environment. At the same time, the U.S. groups have expressed a desire to engage Mexican and Mexican American participants in their activities and a frustration that they do not know how to achieve that goal. Recent efforts have involved Mexican and U.S. residents working together in riparian restoration activities and have led to a reorganization of some tours of Nogales, Sonora, where Mexican rather than U.S. guides frame the discussion of environmental problems, put the region's development in a larger context, and focus on what is being done to address the problems. A long-term relationship with partners from both sides of the border has provided new opportunities and has created a space within which we can talk about and attend to sensitive issues.

While being interviewed as part of a study of ecological education opportunities in the upper Santa Cruz watershed, an official with one of Arizona's environmental agencies observed that:

Most people in Nogales don't have access to wild environmental areas. For a long time, in terms of thinking about the environment, [I thought] that it was important to protect wilderness areas. The environment must include urban areas where people live. Maybe we need to think that people who live in urban areas need to get access to wilderness areas. I don't think many people in Nogales will have opportunities for vacations.... ARAN is focusing on the urban environment on a daily basis but also bringing in that natural environment part. What they're doing is so beautiful.

In a discussion about the value of the partnership with a university student, Nogales, Sonora, high school students who had been involved for more than a year endorsed binational collaboration as a "great idea" because ideas could be shared and exchanged. They also suggested that it was better to have as much collaboration as possible to enable all the partners to do more. Newer members arrived at the same conclusion and added, "Even though we are two different countries the environment is the same one, and they as well as we must take care of it."

The transition from maintenance to expansion occurred when we recognized that the scope of existing projects and configuration of members were insufficient to address what were emerging as key problems, including the need to reinvent the wheel at each new school or green area. The expansion of the partnership, both in size and scope, has created new challenges for the members, especially related to communication and coordination of efforts. Despite this, partners recognize that reaching solutions to pressing environmental problems

will require collaboration by all sectors on both sides of the border and have demonstrated both the willingness and ability to work through difficult issues. University participants continue to play a key role by listening to concerns, observing interactions, and troubleshooting without taking over decision making.⁶ Achieving and maintaining the proper balance of guidance, leadership, and authority remains a challenge.

One partner who has lived in both the United States and Mexico and worked for governmental and nongovernmental organizations observed that university participants have struggled with being authority figures in the community. Some credibility, particularly among government agencies, has been undermined in situations where the university did not take a more assertive leadership role in the projects. At the same time, this individual did not view this as the downfall of the partnership. She commented that in the present structure the partners have been able to empower members of the local communities to make changes themselves. "We are working on the real heart and soul of democratic change in Mexico.... The university has done a good job steering clear of constitutional issues that prohibit outsiders from exercising power in Mexico, and what we are doing is really making a change.... The political ramifications will be wonderful."

Stage 4: Reinforcing Effective Networks

As a partnership develops, some members join, find it does little to serve their interests, and then leave. Others find initial value in the association, but, as new directions are taken, they discover their role in the partnership is diminished and the costs of participation outweigh the benefits. For example, one of the initial pilot projects was conducted at an elementary school with the active participation of the director and several faculty members. When the director was transferred to another school and replaced by someone with different priorities, the teachers were unable to devote attention to the schoolyard habitat and revegetation projects and withdrew from the partnership.

Partners who begin in a supportive role may become more active as new problems are confronted. Several border health organizations provided small grants to some of the partners to assist with their projects and signed letters of support for larger grant proposals. But they did not actively participate until recently, when the partnership explicitly identified improving local environmental health education and outreach as an objective.

The goal of the approach described here is to generate networks that are sufficiently strong that members can come and go without threatening the cohesiveness of the overall partnership. At the same time, they should be sufficiently flexible that members and relationships among them can change as needed. The partnership had to prove it could be responsive to the needs of its members and resilient to the ebbs and flows of involvement inherent in groups whose members have many other competing responsibilities. For example, though the

initial participation of Nogales, Sonora, city officials was high, that participation waned until recent elections brought a new administration into office. After a couple of years of little involvement by the city, most partners had stopped trying to encourage city participation. New mechanisms had to be put in place when the new administration expressed the desire for a much more central role in the partnership.

When asked to comment on local programs for addressing environmental education, one government official who has been active in border environmental programs for more than a decade responded:

Efforts going on now have more permanence and redundancy—in a good way. There are enough people engaged in them and they are having enough effect that it won't go away. In the past, grants have come in and out, and programs have been here and gone. Now the new relationships are more stable than in the past.

To date, the partnership has successfully established a network within which both action and learning are prioritized for professionals as well as others. While anthropology and engineering students learn about ecology and how to manage people and projects, environmental educators learn about border politics and globalization. Each partner organization establishes a structure within which new members are brought in. Schools are central to the organization, so we have had to plan for turnover. University of Arizona students participate as interns or in classes. Students at a Nogales preparatory school begin in their sophomore science classes. They can continue the following year as members of the school's ecology club and may become club leaders to fulfill their social service requirements for graduation. At a secondary school, one third-year teacher (the equivalent of ninth grade in the United States) has begun working with second-year students to introduce them to basic concepts and leadership skills. They are then able to help organize and teach their peers during their third year at the school, when all students in Sonora take classes in ecology. As time passes, students from the primary schools graduate to the secondary schools, secondary students move to the high schools, high school students move to the technical college, and college students take jobs in maquiladoras. New institutions, therefore, become involved in the partnership. Partners have set the goal of beginning projects in new neighborhoods at the same time that the group establishes connections to the primary schools.

According to one student from the technical college, "I cannot see myself not being part of the committee because I plan to belong to it for as long as possible. I plan to help whoever takes it over and help them get familiarized with other partners so that they can continue this work."

Throughout all levels, we are continually gathering data—about the environmental conditions, the learning gaps, and the experiences of participants. Initially most of the data gathering was organized by applied anthropology interns and graduate students, but these students have coordinated efforts with students at the secondary, high school, and technical

college levels. University students help organize and carry out projects and programs; they learn and practice participant observation, supplemented by interviews and experiments. Among their most significant contributions are their field-notes, which document changes in the partnership over time and allow us to identify both successful and unsuccessful approaches.

To ensure that information is shared and used in a timely fashion, I meet weekly with the students at the university. With students assigned to different projects and groups, these meetings provide us an opportunity to discuss individual project or partner needs and to reflect on larger issues as well. For example, when concerns about the attitudes of some U.S. environmentalists toward Mexicans and Mexican Americans were first noted, we decided to pay greater attention to this issue and look for ways to increase interaction among the groups. Regular communication between university participants and community partners, via phone calls, e-mail, and face-to-face interaction, helps ensure that similar conversations take place among members of the larger group as well.

Summary and Conclusions

Long-term partnerships begin with shared goals, grow with trust, and are maintained by considerable investments of time and energy from their members. Approaching community-based research with a focus on partnerships rather than projects requires commitment to relationship building within a context where the exact nature of the problems to be investigated, the most appropriate solutions, and the potential outcomes are not well known in advance. Success requires vigilance in maintaining a loose structure within which participants can emerge as leaders and adjust their level of involvement in relation to competing demands, without hierarchies, formal compensation, or predetermined lines of authority.

The collaborative efforts described in this article have benefited from continuity derived from the committed involvement of key participants. Fundamental to the approach is recognizing that partners will be around a long time and both *should* and *will* play a role in identifying problems and developing and implementing solutions to them. Given the complexity of environmental problems and their wide-ranging impacts, such partnerships must engage participants from all sectors and must incorporate decision makers at all levels. Effective partnerships will be able to demand that state, national, and even international policy makers pay attention to the concerns of local residents and leaders. Applied anthropologists can facilitate critical dialogue by organizing and presenting information in formats that are accessible to community members and policy makers alike.

The approach described here is one step in a long process of imagining and reinventing the role of researchers and their institutions in identifying and addressing problems that are labeled “environmental.” There remain many things to learn and much to do. The social, political, and ecological

conditions under which we are presently living developed over many, many decades. We must address problems simultaneously within all three of these arenas if we are to see positive change. Alternatives will develop out of learning, experimentation, and reorganization. Establishing the social frameworks within which this is possible is not a trivial task. Applied anthropologists, with an appreciation of multidisciplinary and inclusive approaches, a healthy respect for the challenges of community work, recognition of the importance of history, and an appreciation for patience and simply “hanging out,” can and should play a critical role in these endeavors. To do so, we must also study environmental science, philosophy, and pedagogy, and be ready to tackle new topics as they arise. Be they processes of erosion, the behavior of aquifers, or spiritual beliefs about the proper relationship between humans and everything else on this planet, these topics form the basis from which we will generate new knowledge adequate to the tasks at hand. To be effective, we must be rigorous, persistent, and hopeful.

Notes

¹The notion that students educated in the United States are oppressed and are paying for their own oppression is not original (see, for example, Faber 1972). In her 2003 essay, “Learning to Be Stupid in the Culture of Cash,” Luciana Bohne effectively uses the concept to explore the depth of ignorance of our students and the consequences for U.S. democracy and our public policy. In general, critical pedagogy is the examination of our system of education and alternatives that can transform dominant social and cultural values (see Apple 1982, 2000; Giroux 1988).

²During the 1990s, U.S.-Mexico border communities were inundated with researchers when government-sponsored programs such as those of the North American Development Bank, a product of the North American Free Trade Agreement (NAFTA), and the U.S. Environmental Protection Agency’s Border XXI program focused attention and resources on border issues. Also, large private organizations such as the Ford Foundation and Pew Charitable Trusts created special border initiatives. While some of the studies created measurable improvements, many others generated reports that led nowhere. Local frustration with government agencies, university researchers, and other outsiders, who were generally perceived as having used such opportunities to advance their own agendas and then left when the money dried up, has been understandably high.

³The acronym means “they plow” in Spanish.

⁴Within Nogales, Sonora, trees are regularly distributed to citizens by city, state, and federal government officials as well as by local businesses, including maquiladoras. Seedlings are obtained from government-run nurseries and taken to a site within the city, where, following speeches, residents line up to receive the trees.

⁵Colegio Nacional de Educación Profesional Técnica (CONALEP) is a technical high school, and Escuela Ignacio Covarrubis is a primary school; both are located in Nogales, Sonora.

⁶The question of authority in decision making will continue to be tested as individual partners acquire and manage resources on behalf of the partnership. The recent grant was awarded to the university on behalf of ARAN, and I have had to make an extra effort to demonstrate that decisions about the money and the activities conducted with grant funds will be made by the entire group.

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