Applying Asset Mapping to Protected Area Planning and Management in the Cordillera Azul National Park, Peru

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Research

Abstract

Participatory conservation efforts are now common throughout regions of high biodiversity in the developing world. Standard approaches to participatory conservation begin with need-based assessments that identify human-induced ecological threats and livelihood deficiencies, but this focus on "threats" and "needs" tends to reinforce perceptions of rural people as predatory, poor and dependent. We examine the theoretical, conceptual, and methodological application of an alternative, "assets-based" approach to participatory conservation and the co-management of natural resources in areas of high cultural and biological diversity. As a case study, we report on the implementation of an asset-mapping activity applied in the buffer zone of the Cordillera Azul National Park in north-central Peru. Data were collected by community facilitators in 53 communities within the park's buffer zone. These data encompass local knowledge systems, community visions for the future, and innovative livelihood strategies compatible with conservation goals. By focusing on these social assets, this approach demonstrates the ways in which positive, pre-existing cultural characteristics may be used to plan and guide the management of a protected area. We describe how this approach has helped to empower local communities and to improve dialogue and transparency between disparate stakeholders. We also include a discussion of the challenges and limitations of this asset-mapping activity.

Introduction

Debates about the role of local people in protected areas abound, both in terms of impact upon protected areas and the participation of local people in protected area management. While some argue that protected areas and local participation share fundamentally incompatible objectives (e.g., Redford & Sanderson 2000), and that protected areas with human influence are less able to improve forest integrity than those without human influence (Brandon *et al*. 1998, Bruner 2001), other research shows that humans have aided in the protection of plants and other natural resources therein, leading to more diversity and similar or better percentage forest cover than in uninhabited protected areas (Nepstad *et al*. 2006, Tuxill & Nabhan 2001).

In general, participatory approaches have become nearly ubiquitous in conservation programs (Agrawal & Gibson 1999), but challenges persist in the management and co-management of protected areas with local participation (Barrett *et al*. 2001). Furthermore, it is clear that threats to biodiversity have occurred in tandem with the disappearance of indigenous languages and traditional ecological knowledge (Maffi 2005), yet a divergence persists between those who advocate the preservation of biodiversity without human intervention (e.g. Terborgh 1999, Redford & Stearman 1993), and those who feel that biological diversity and cultural diversity do not exist in isolation but are linked (Allegretti 1999, Maffi 2005, Schwartzman 1989). Regardless of the approach, all signs indicate

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that there exist veritable, ecological and social crises that are connected (Meffe & Carroll 1997).

This article examines the theoretical, conceptual, and methodological application of an "assets based" approach to the co-management of natural resources in areas of high cultural and biological diversity that may provide an alternative to the standard practices for engaging communities (commonly known as Integrated Conservation and Development Programs—ICDPs). We begin with a review of the challenges of standard approaches, and then discuss the conceptual framework of the assets based approach. We then analyze the data on human-plant interactions and supporting data from a large-scale asset-mapping exercise conducted with 53 communities--which may be defined as traditional, indigenous, and peasant--in the buffer zone of the Cordillera Azul National Park in Peru, and discuss how the data was used to engage communities in natural resource management and conservation efforts. We found that the asset-mapping exercise in itself empowered the communities and improved transparency among stakeholders through the creation of a comprehensive database designed to be user-friendly and accessible. It also increased dialogue among and between stakeholders to inform the park's management plan and the allocation of resources for the park and its buffer zone. The use of the data base guided participatory efforts with the communities in land use planning and in small scale diversification of their horticultural plots. We conclude with a discussion of the challenges and limitations of this approach.

An assets-based approach identifies relevant local knowledge systems, visions for the future, and innovative livelihood strategies compatible with conservation goals in frequently overlooked places (e.g., kinship networks, oral histories, human-plant interactions). Originally developed by sociologists at Northwestern University, who applied it to community development issues in urban contexts of the developed world (Kretzman & McKnight 1993), and anthropologists working with community development professionals at the University of Tennessee, Memphis (Bennett & Hyland 2003, Hyland 1999), the approach was adapted by anthropologists at the Field Museum of Natural History in Chicago and applied to conservation programs in rural, biodiverse regions of the developing world (Alcorn *et al*. 2005, del Campo *et al*. 2003, 2004). In this article, we discuss how this assets-based approach differs from standard economic development programs that currently accompany conservation efforts. We hope this article contributes to the debate on the efficacy of participatory approaches to conservation programs and protected area management (e.g., Berkes 2004, Tuxill & Nabhan 2001).

Integrated Conservation and Development Projects

Integrated Conservation and Development Projects were initiated in the 1980s to address several problems that surfaced during the first wave of major international conservation efforts, including an inattention to the social and economic realities of local people, the inappropriate allocation of funds, and unrealistic goals for achieving conservation results in short periods of time (Wali 2006). ICDPs had the dual goals of improving local livelihoods while conserving natural resources (Larson *et al*. 1997). However, periodic examinations of ICDP activities revealed that they were having mixed results, and particularly there was criticism that the programs failed to prevent encroachment into protected areas or mitigate the threats to their destruction (c.f. Larson *et al*. 1997).

Measuring the impact of the ICDP programs has been difficult, however (Stonich 2005). The use of indicators for evaluating biological and cultural integrity poses a challenge because they vary widely and across scales. A review of the biological science literature reveals that unprecedented rates of deforestation and degradation (Cochrane *et al*. 2004, Nepstad *et al*. 2002), species performance and/or extinction risks (Moore *et al*. 2003, Root *et al*. 2003), and distribution of single taxon (Gaston & Rodrigues 2003, Pitman *et al*. 2002) are common yet disparate indicators that lead to different assessments of project success. Measuring the success of the programs in providing sustainable livelihoods or protecting cultural diversity has also been challenging. Throughout, indigenous and traditional people continued to endure the impact of development-driven deforestation, sometimes to the point of extinction (Colchester 2003).

As major conservation organizations grew frustrated with these results, they appeared to retract investment in ICDP efforts. For more than a decade, therefore, conservation priorities have re-emphasized restricted habitat protection leading to alarming trends away from local collaboration to more exclusionary approaches to biodiversity conservation (Chapin 2004, Colchester 2004; see also Dowie 2005). Although the large conservation organizations disputed Chapin's indictment (c.f. their responses in the January 2005 issue of WorldWatch Magazine), it is clear that ICDPs have lost popularity and stand in need of renovation.

To proceed ahead, however, merely asserting that communities are involved in conservation efforts or that their needs are being addressed through ICDPs will be insufficient to providing sustainability for long-term protection. As Stonich (2005) points out, we must clarify definitions of "participation" and toward what end it is being applied and gain a better understanding of both the local and wider social and political contexts before implementing any project. Furthermore, we must recognize that a major problem with the standard ICDP approach has been the unques-

tioning adoption of "Development" as a strategy for improving local livelihoods. This has meant that these programs have often relied on indicators that emphasize poverty and reinforce perceptions of local people as poor and dependent, as the basis for creating programs. These indicators perpetuate a common deficit model (Kretzman & McKnight 1993), in which communities are viewed as clients in need of external assistance to attain an acceptable standard of living through government and non-government service delivery. Examples include the World Bank's World Development Indicators database and the United Nations Development Programme's Human Development Index, which statistically test for degree of development through proxies such as illiteracy, income, infrastructure, and disease. These criteria have been adopted by major lending institutions that administer funds to large conservation non-governmental organizations, which, in turn, provide resources for their in-country counterparts.

Although standard measurements of community development provide a snapshot of the regional context in which communities live, they generally fail to incorporate communities' preexisting social organization, values, and resource management practices that are compatible with conservation objectives. They also fail to recognize the creativity with which local people have implemented their own conservation efforts or negotiated the introduction of conservation agendas on their terrain (Agrawal 2005, Conklin & Graham 1992, Keck 1995). Of course, not all ICDP efforts are premised on this assumption, and many today incorporate participatory appraisal methods to elicit community perspectives. However, these appraisal methods rely on rapid assessments that ask community members to list their "needs", which are often expressed in relation to a market economy. Typically, in these appraisals, community members stress their desire to have better access to education and health services, and their need for cash –generating activities. ICDP efforts then focus on finding "appropriate" cash-generating activities ("green-certified" cash crops, managed forestry, ecotourism programs, for example) that might draw local people away from intensive exploitation of fragile habitats.

An asset-based approach to conservation

In contrast to the deficit-oriented approach to conservation work, we suggest an "asset-based" approach that privileges local knowledge and resource management systems. An asset-based approach recognizes that citizens have gifts and capacities that are operative and highly functional in communities (Kretzman & McKnight 1993), and can be used to develop conservation programs in conjunction with local people rather than for them. Social assets may be broadly defined as the relationships people create to meet the needs of everyday life and plan for the future, as well as the repositories of traditional knowledge and personal and regional histories. In identifying social assets, social scientists emphasize local patterns of social organization and capacity-building strategies, as well as social networks, attitude and commitment toward place, and social activism in communities (c.f. also, Bennett & Hyland 2003). The approach has been widely acclaimed by urban planners and community development professionals for its efficacy in organizing community building efforts and catalyzing social change. Currently, assets based approaches are being implemented in a variety of urban settings, both in the United States and internationally (Mathie & Cunningham 2002).

The approach, however, has generally not been applied to conservation programs and usually does not incorporate assessment of environmental or place-based assets (John McKnight, personal communication 2002). One of the first attempts at using it in this way was in our study of the attitudes toward environmental conservation in the Lake Calumet region of Chicago (Wali *et al*. 2003). In this study, we integrated the identification of social assets with an examination of place-based values and the considerable assets of wilderness habitats in the region, creating a GIS-based map of both the social and environmental assets (www.fieldmuseum.org/calumet). This experience encouraged us to apply an assets based approach to a major conservation effort in the Cordillera Azul National Park, Peru. A critical underpinning of our decision to apply this approach in the neotropics is the position that while human impact on the environment is indisputable, the division between the cultural and natural aspects of community life is false (Berkes & Folke 1998, Cronon 1995). Archaeologists and paleoecologists are finding interesting evidence that today's "primary" forests—often considered biodiversity hotspots—are actually anthropogenic (Denevan 1992, Erickson 2000, Heckenberger *et al.* 2003). In addition, several aspects of traditional knowledge and social systems have persisted despite significant cultural and biological impacts throughout history, including the European conquest of the New World, modernization and development, and globalization (Agrawal 2005, Sahlins 1999).

We believed that identifying existing conservation-compatible practices and beliefs together with social organization strengths could be useful to promote conservation goals and the development of management plans with local communities. The work of the Cordillera Azul National Park team has demonstrated the potential benefits of this approach.

The Cordillera Azul National Park, Peru

Following its rapid creation in 2001 by Peru's interim president Valentín Paniagua (2000-2001), the 1.35 million hectare Cordillera Azul National Park in north-central Peru was a major victory for conservation, but faced significant challenges to involve its heterogeneous, populated buffer zone. Following IUCN Category II, the park was deliberately created "to exclude exploitation or occupation

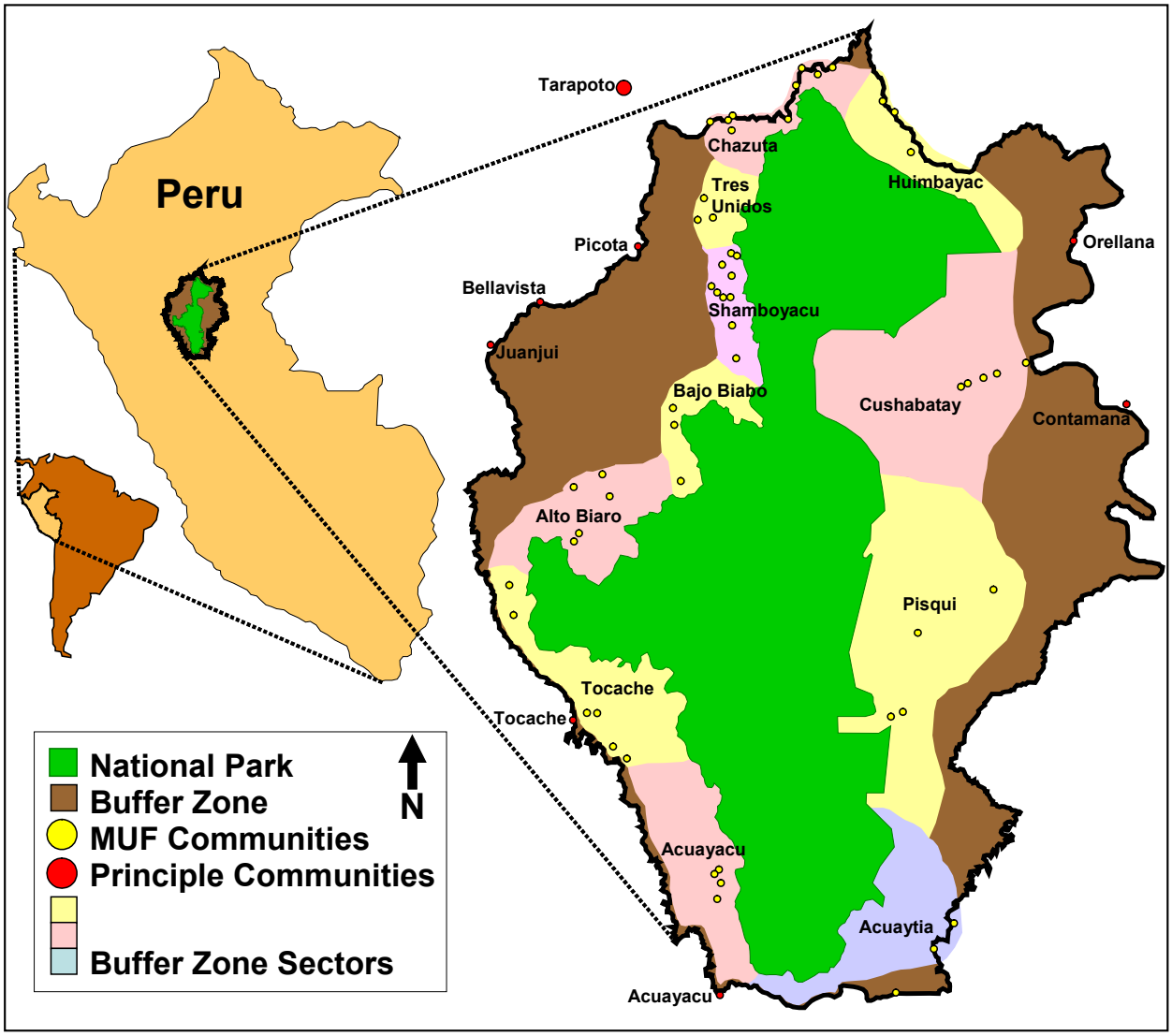

Figure 1. The Cordillera Azul National Park In Peru and the **Mapeo de Usos y Fortalezas** (MUF) sectors in the buffer zone.

inimical to the purposes of designation of the area" (IUCN 1994). However, the ecological and cultural composition inside and outside of the park is diverse. The buffer zone of the park contains about 100,000 people—53% of whom live along the high-density Huallaga valley on the western side of the park. The rest of the population is found along the southern part of the park (~21%) and the eastern side of the park (~26%), the latter of which runs along the Ucayali river and is comprised of longer-term residents belonging primarily to Shipibo, Cacataibo, and Yine indigenous communities (Figure 1).

Upon creation, the challenges in the Cordillera Azul National Park were very complex. Illegal logging operations were few but sophisticated. In addition, a few smallholders and residual coca plantations were identified. Hunting was common inside of the park, particularly along the densely-populated Huallaga river basin. Finally, Cacataibo indigenous people in voluntary isolation were rumored to reside in the southern part of the park. The social diversity outside of the park, as well as the social and ecological dynamics inside of the park, were equally prioritized during the first years of the park's implementation. The habitat diversity within the park and the population density outside of the park made local participation a key aspect of achieving long-term sustainable protection. The Peruvian government also realized that financial stability for the park might best be attained through semi-private management. They subsequently accorded a local non-governmental organization, the Center for Conservation, Research, and Management of Natural Areas (Centro de Conservación, Investigación y Manejo de Áreas Naturales-CIMA), to develop and implement the park management plan. CIMA co-administered the park and developed

activities with communities in the buffer zone with Peru's federal Natural Resources Institute (Instituto Nacional de Recursos Naturales-INRENA) through funds obtained by The Field Museum from the United States Agency for International Development (USAID), the Betty and Gordon Moore foundation, and the MacArthur Foundation.

To insure community participation in both the design of the management plan and its implementation, a major, participatory asset-mapping activity—the **Mapeo de Usos y Fortalezas** (MUF)--was initiated to formulate a baseline of information that could guide activities to be developed with the local people. The objectives of the MUF were 1) to create an opportunity for dialogue between park staff and local communities about the park, its borders, expected benefits, and regulations; and 2) to obtain information on local assets (household and community-level) and existing resource use strategies. The immediate goal of the MUF was to inform the design of the park's five-year management plan, a requirement by the Peruvian government, using the social assets in areas of human impact and/or interest. This included the zoning plan for the park, meso-zoning of the region, and the development of subsistence and income-generating activities with communities in the buffer zone of the park.

To conduct the MUF, local facilitators elected by their communities were trained to lead the data collection process and to disseminate information about the national park. The methodology and materials were designed by Field Museum anthropologists Alaka Wali and Janis Alcorn in conjunction with anthropologists and sociologists on staff at CIMA. The methodology combined the social asset mapping strategies previously applied in urban settings with natural resource use mapping, an increasingly popular mode of eliciting community participation in resource management (c.f. Alcorn 2000, Chapin & Threlkeld 2001, Herlihy & Knapp 2003).

Methods

57 communities were identified in the buffer zone of the park, of which 53 participated in the MUF. The 53 communities were divided and grouped into 11 sectors created by the park team to facilitate activities and data management. Depending upon the size of the community, one or more facilitators from each community were elected to collect data for a period of two months in community assemblies, focus groups, and household interviews using a variety of methods, including semi-structured and structured interviews, photo elicitation, and resource and territory mapping. Data collected were extensive, ranging from themes such as community identity, migration, visions for the future, and local myths and legends, to economic and subsistence resource use. In addition, interviews were carried out with technicians at health posts, with teachers and directors of primary and secondary schools (when present), and with specialists and significant individuals such as shamans, healers, and community leaders and founders.

Accessibility and transparency were priorities in the process of data collection, analysis, and storage. The collection period was wholly participatory as it was led by community facilitators, with monthly or bi-monthly visits by the park team to answer the community facilitator's questions and assist with data collection. At the end of the data collection period, the data were entered and analyzed by park staff, which managed them in a simple database created in Microsoft Excel and Microsoft Access, linked to a GIS-based mapping effort. The objective was to make the entire database accessible to all stakeholders, including communities, government agencies, non-governmental organizations (NGOs), students, and researchers so that the management of the park and its buffer zone would be guided by the assets. The goal was to empower the communities as they collected data on their local assets and management practices, and to use dialogue and consensus to create a comprehensive and accessible database upon which park management plans would be designed and implemented.

MUF Results and Discussion

The social assets uncovered in the 53 communities that participated in the MUF cover a wide range of capacities and innovative community-building and resource management strategies. Communities in the buffer zone of the park place great pride in their traditional knowledge and livelihood practices. These are further depicted in the shields local residents compiled in the focus groups, some of which vary depending on local knowledge systems and length of residence in the region. While long-term residents tend to identify the use of native species and traditional ecological knowledge more clearly than recent migrant settlers to the region, most communities demonstrate that a sense of pride is not necessarily linked with its economic potential, as the household surveys on income-generating activities demonstrate (Appendix A). Rather, the data make clear that the quotidian interaction people have with their local surroundings is linked with an attachment to place and ecological knowledge, and is manifested in their use and relationship with the landscape (Altman & Low 1992).

Plant resources were divided into agricultural, timber and non-timber forest products. These data were analyzed to understand degree of interaction with the market economy, subsistence livelihoods, and medicinal plant use. In addition, they were analyzed in conjunction with data indicating the use of traditional ecological knowledge, particularly through the presence of myths, legends, language, and the presence of healers or shamans (Table 1).

Table 1. Defining characteristics of communities indicating the presence of traditional ecological knowledge, indigenous languages and herbal specialists. Source: MUF, Encuesta a Jefes de Hogar, 2003.

Sector	Attributes (how self-characterized)	Healers/Shamans	Language (other than Spanish)
Huimbayoc	Organized	Healers	Quechua
Chazuta	Agriculture, Hunting	Healers	Quechua
Tres Unidos	Agriculture	Healers	Quechua
Shamboyacu	Hunting, Fishing	Healers	Quechua
Bajo Biavo	Agriculture	N/A	N/A
Alto Biavo	Organized	Healers	Quechua
Tocache	Agriculture	Healers	Quechua
Aucuyacu	Agriculture, Strong traditions	Healers	Quechua
Aguaytiya	Agriculture	Healers	Cacataibo/Shipibo
Pisqui	Hunting, Agriculture	Healers/Shamans	Shipibo
Cushabatay	Agriculture, Strong traditions	Healers	Yine

Of the 53 communities in which data was collected, all but three in the Bajo Biavo sector share the presence of an indigenous language and the presence of healers or shamans, also referred to as **especialistas herbários** (herbal specialists) (MUF 2003). Communities that do not possess healers, shamans, or indigenous languages tend to be recent arrivals to the region. The strongest example of this is outlined in Table 2, which shows how all respondents from the Bajo Biavo sector had arrived within the last five years (n=57). Residents from Bajo Biavo reported no presence of indigenous language or the presence of individuals-- such as healers and shamans-- who possess traditional ecological knowledge. On the other hand, the Aguaytia sector is comprised of Shipibo and Cacataibo indigenous communities, which demonstrate long-term residence in the region and the presence of indigenous languages and herbal specialists (Tables 1 and 2).

Community facilitators who carried out the MUF conducted eight focus groups in each community—four with a "mixed" group of residents of different ages and both genders, two with just women, one with community leaders (e.g., president), and one with "specialists" or "experts" (e.g., the best hunters). 10 topics were selected to discuss with participants, including timber and non-timber forest products, agriculture, social organization, and economic activities.

Timber species most sought after for income generation were tropical cedar (Cedrela spp.) and mahogany (Swietenia macrophylla), followed by other valuable timber species like Cedrelinga cateniformis and Amburana cearensis. Timber is extracted primarily for commercial purposes and household use (n=45). However, the commercialization of timber does not represent the primary source of income. Only 3.4% of the sample population in the household surveys reported timber as the primary income-generating activity in the household. Agriculture, on the other hand, represents the primary income-generating activity at 48.5% of households, followed by hunting (15.5%) and fishing (13%). Only .6% of households named medicinals as a primary source of income (Appendix A). Non-timber forest products (leaves, bark, resins, fibers, seeds, fruits, nuts, and mushrooms) are collected and used as medicinals, foods, handcrafts, construction, and domestic articles (n=129).

Having collected data on migration patterns, timber and non-timber plant resource use, and traditional ecological knowledge, the facilitators then conducted a series of exercises to learn what characteristics, traditions, and abilities local people identify in themselves and their communities, and how these are connected with the physical landscape. One important indicator used for determining strength of community cohesion was the articulation

Table 2. Number of years the head of household has been living in the community. Source: MUF, Encuesta a Jefes de Hogar, 2003.

Sector	Number of years in community				
	1-2	3-5	5-10	10-20	21+
Huimbayoc (n=49)	10%	4%	12%	31%	43%
Chazuta (n=51)	2%	6%	6%	27%	59%
Tres Unidos (n=75)	37%	23%	24%	9%	7%
Shamboyacu (n=143)	36%	25%	12%	13%	13%
Bajo Biavo (n=57)	81%	19%	0%	0%	0%
Alto Biavo (n=142)	25%	12%	6%	21%	36%
Tocache (n=116)	10%	15%	6%	47%	22%
Aucayacu (n=92)	33%	28%	4%	15%	20%
Aguaytia (n=32)	3%	19%	16%	16%	47%
Pisqui (n=39)	3%	8%	10%	51%	28%
Cushabatay (n=86)	6%	12%	17%	21%	44%

of place attachment—the place-specific symbolic values people attribute to the natural and built environment (Altman & Low 1992). One part of the asset-mapping exercise was the creation of community shields, to understand how residents imagine the community vis-à-vis their physical surroundings and the outside world. The shield exercise was organized by the community facilitators, who gathered a representative group of men and women of different social groups and ages into a focus group. The group collectively agreed upon and drew a community shield in each of the 53 communities. The shields were then analyzed and discussed with community members.

In nearly every shield, some aspect of the environment was selected to represent the community, such as domesticated and native plants, including medicinals. These depictions were generally combined with a symbol of production, such as agriculture and/or cattle ranching. For example, Vista Alegre, a community comprised of some Quechua-Lamista families in the Shamboyacu sector, drew the "blue" mountain range for which the Cordillera Azul National Park is named, and indicated that the tree depicted is a popular medicinal that is also valued for the construction of domestic items (Figure 2). Similarly, the Nuevo Amanecer community drew a mountain range and included a drawing of native medicinals and foods (e.g.,

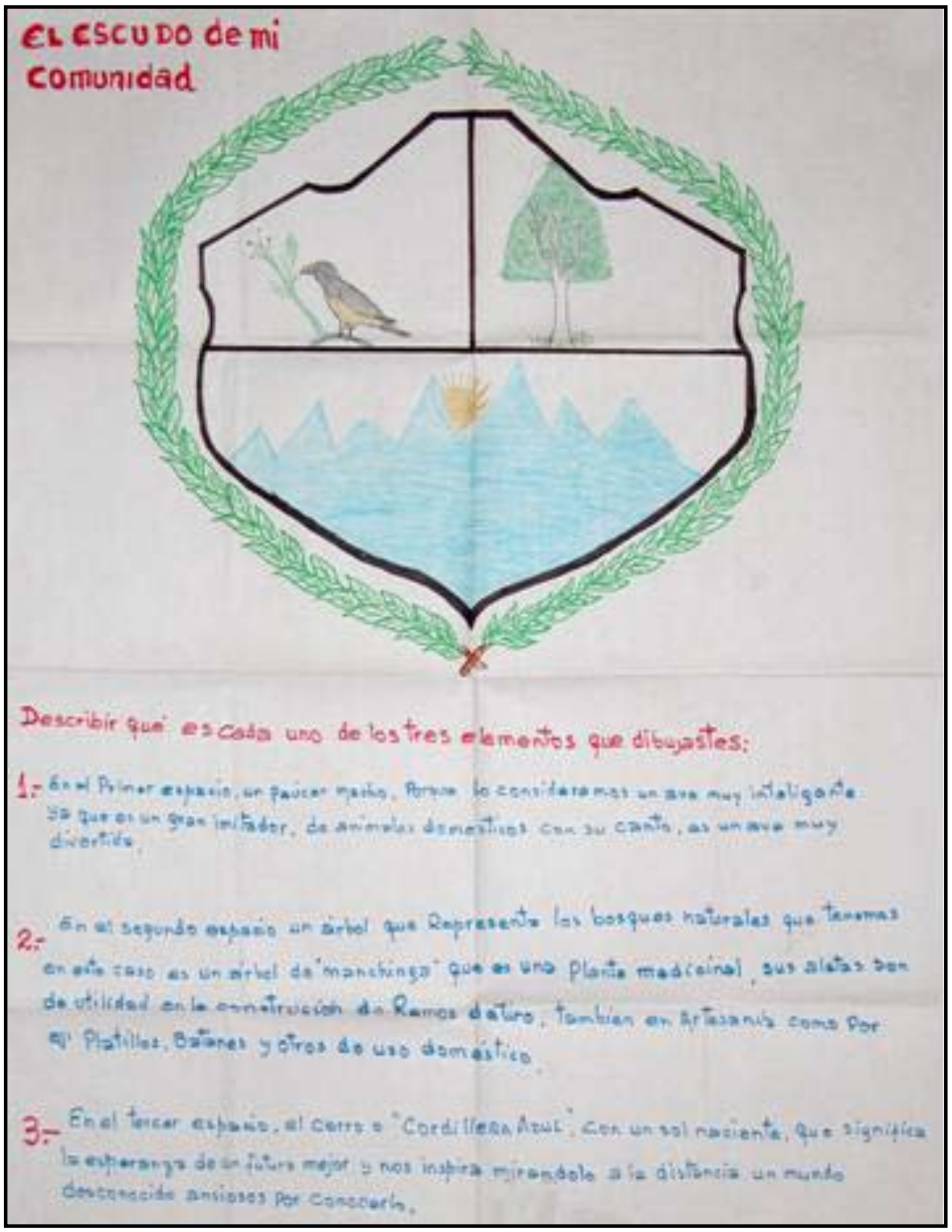

Figure 2. The Vista Alegre community shield.

Figure 3. The Nuevo Amanecer community shield.

uña de gato--"cat's claw", *Uncaria tomentosa* (Willd. ex Schult.) DC., but included introduced cattle and coffee as primary symbols of animal and plant life for the community (Figure 3). Other shields represent individual and collective capacities the community is proud of. Communities with the presence of indigenous people included depictions of local traditions and livelihoods, such as textiles and ceramics (e.g., Quechua-Lamista indigenous people on the western side of the park, and Shipibo, Cacataibo and Yine indigenous people on the eastern side of the park).

Applying MUF data to create an assets-based conservation practice

Shortly after the MUF asset-mapping exercise, the park team expanded considerably with support from USAID. The team incorporated professionals mostly from the region, including agronomers, foresters, extension agents, and environmental educators, to implement conservation programs. A corps of park guards was also created that included local residents from the buffer zone communities. CIMA also formed collaborations with three local NGOs to implement conservation compatible programs in the buffer zone. In designing the programs, the team used the MUF database to take account of the identified assets and continue to use a participatory approach while implementing activities with local communities. Because the MUF identified the capacity and will of local people to engage in conservation, the programs focused on two major areas: stabilizing subsistence-oriented land use practices in order to prevent further deforestation in the buffer zone, and implementation of land-use plans at the community level to secure land rights and provide resource management strategies.

The park team also provided environmental education programming in urban schools in the buffer zone and increased access to information about the Park and community activities in the rural communities. Thus, rather than offer the standard "packet" of development projects (e.g., school buildings, health posts, cash crops, etc.), the team worked to strengthen the subsistence base for communities so that they could maintain a good quality of life while protecting not only the park but also their own lands in the buffer zone. Technical assistance was provided in agroforestry, crop diversification, and reforestation of watersheds. The team also provided information and guidance for negotiating bureaucratic processes so that communities could establish their own forest preserves and community boundaries. Some communities developed important norms for the use and management of game and fish.

Conclusion: Opportunities, challenges and limitations of an assets-based approach

The assets based approach, as described above, departs from the ICDP approach in that it does not privilege the entry of communities into market-oriented development as a "reward" for conserving protected areas. Rather, it is based on community-expressed desires for conservation, and strengthens a subsistence-oriented lifestyle that is largely compatible with conservation. Although conservation-compatible cash crops are part of the mix that communities might espouse, they are not the primary focus of the technical assistance offered by the team. Instead, communities are given the space, time and information to make their own decisions about how they want to manage their resources and determine the bases for improving their quality of life. In return for technical assistance, they commit to support the park by volunteering in park protection activities and maintaining vigilance against encroachment or illegal activities inside the park.

As a methodology based on the assets approach, the MUF improved transparency among stakeholders. It became an

effective vehicle by which communities living in the buffer zone of the park—covering territory in four states--were informed about the park and entered into a dialogue about policies concerning the region and their concerns and opinions about resource management. Through the MUF, dialogue was improved with Cacataibo indigenous people along the south-eastern side of the park, yielding community reports of their kin in voluntary isolation within park borders. A partnership was subsequently formed with anthropologists from the Lima-based Instituto del Bien Común ("the Commonwealth Institute"). In collaboration with park staff, indigenous people, and representatives from IBC, the park was zoned to ensure the protection of those in voluntary isolation inside of the park. The asset-mapping activity also improved transparency among stakeholders by providing a holistic snapshot about community activities in the park and the buffer zone, the park team's expectations of the community, and federal and state rules and regulations pertaining to protected areas and resource management in the buffer zone. As a result, park borders in several areas were negotiated, as were extractive activities in certain sectors of the park where residents traditionally hunted and traversed.

Second, the MUF was essential to achieving efficient and equitable management of the park. It was designed to identify the individual and collective capacities of community members that help them achieve the symbolic and utilitarian aspects of community life, including places of spiritual or symbolic significance and extractive activities inside of the park. This data informed the park's five year management plan required by Peruvian government in the implementation of a protected area. The data were also used to inform zoning of the park and the buffer zone. Since the MUF, the park team has been using the identified assets to implement activities in the buffer zone of the park, such as agroforestry, game management, and environmental education. Additionally, in 2005, the assets database was updated with another exercise, this time bringing key leaders from the communities together to discuss how assets have changed. Subsequently, in 2006, the park team assisted communities with securing recognition of their territories by the regional governments, giving residents additional control over the management of their resources.

Finally, the data collected in the MUF empowered the communities by making them aware of the ways in which their individual and collective capacities represent key tools for negotiating and achieving sustainable futures (Alcorn *et al*. 2005). The participatory aspect of this project fostered an environment in which local residents were armed with knowledge about their capacities and visions for the future. The MUF effectively engaged traditional and peasant communities living in the Huallaga valley on the western side of the park, into a dialogue with Shipibo, Cacataibo, and Yine indigenous peoples in the Ucayali basin on the eastern side of the park. Forest resources, regional policies, and their concerns and visions for the future of their communities and the park were thus openly discussed. This level of engagement shifted some power and negotiating weight into the hands of local residents and aided collaboration and strategic planning between even the most geographically and culturally disparate communities.

The MUF thus represented a novel, participatory approach to improve transparency among stakeholders, empower local communities, and achieve co-management of the park. It revealed how local communities were primarily concerned with long-term integrity of their subsistence base while simultaneously engaging with the market economy. The evidence provided by the MUF was strong enough to convince the park team that they could work effectively with local communities to implement conservation programs.

While the approach offers a sustainable alternative to ICDPs, it also has challenges in application. First, the MUF itself was a more costly information-gathering effort than standard rapid appraisals that typically accompany ICDP efforts. The MUF was possible because of the high level of funding that the park team initially garnered. Not only was it costly in monetary terms, but also in terms of time. Although a subsequent application of the MUF took less time and money, it was greatly facilitated by the trust, experience, and time the team was awarded during the initial application of the MUF.

Another challenge facing this type of approach is convincing professionals who are used to implementing development-style projects to try a different approach. There was a great deal of anxiety among team members that community residents would not be satisfied with the seemingly low-key, non-standard offerings that were proposed and would want more traditional aid packets—new infrastructure or credit, or seeds/plantings for popular cash crops (coffee and cacao). There was also skepticism on the part of the professional staff about the depth of commitment toward conservation expressed in the MUF by local residents.

A final challenge facing this approach is that even with communities engaged and desirous to implement conservation efforts, large-scale forces continue to threaten the fragile landscapes in and around protected areas. Illegal logging propelled by urban-based commercial interests, which was universally opposed by the community's closest to the park, continued to be a destructive force in the region. Although the park team worked hard with the communities to strengthen local regulatory mechanisms, it was difficult to confront powerful actors who had money and support from corrupt officials. The experiences in the Cordillera Azul National Park demonstrate that conservation with local participation is possible and potentially sustainable. However, the effective conservation of biologi-

cally and culturally diverse landscapes requires efforts at multiple levels and more resources than most ICDPs can feasibly devote.

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Appendix A. Primary income-generating economic activities reported in households in each sector. Source: MUF, Encuesta a Jefes de Hogar, 2003.

Activity	Percentage of each activity by sector											
	AGUAYTIA	ALTO BIAVO	AUCA-YACU	BAJO BIAVO	CHAZUTA	CUSHA-BATAY	HUIMBAYOC	PISQUI	SHAMBO-YACU	TOCACHE	TRES UNIDOS	TOTAL
TIMBER/NTFPs (n=70)	12.8	9.1	0.0	0.0	0.0	4.9	0.0	5.2	0.5	0.6	0.0	3.4
AGRICULTURE (n=1011)	40.9	42.7	63.8	80.0	44.4	38.4	51.2	29.7	60.3	66.5	49.0	48.5
CONSTRUCTION (n=3)	0.0	0.0	0.0	2.9	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.1
ARTESANRY (n=130)	4.7	10.9	1.4	4.3	8.2	0.5	2.5	14.5	7.0	1.8	4.7	6.2
CARPENTRY (n=21)	0.0	0.4	0.7	0.0	0.0	0.0	2.5	1.9	1.9	1.2	1.3	1.0
HUNTING (n=324)	13.4	17.9	17.0	7.1	20.3	18.7	16.9	13.0	12.6	10.2	17.4	15.5
DOMESTIC ANIMALS (SMALL) (n=112)	18.1	0.0	0.0	0.0	0.0	21.2	0.0	15.6	0.0	0.0	0.0	5.4
CATTLE (n=130)	0.7	6.2	2.1	2.9	7.7	5.4	6.6	0.7	9.3	16.2	10.1	6.2
FISHING (n=272)	9.4	12.0	14.9	2.9	19.3	10.8	19.8	19.3	7.5	3.6	12.1	13.0
MEDICINAL PLANTS (n=12)	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	5.4	0.6