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Bribing Biodiversity: Corruption, Participation, and Community-Based Management in Venezuela*

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ABSTRACT Widespread alarm over the continuing decline of marine and freshwater fisheries has prompted research on the theory and practice of community-based management (CBM). Considering the suite of possible CBM benefits—including local involvement, compliance with regulations, reduced enforcement costs, and sustainable resource use—it is understandable that CBM projects are on the rise. However, there is insufficient examination of the challenges to CBM and the context-specific feasibility of grassroots stewardship. In response, we applied an assessment framework to a Venezuelan fishery to evaluate the feasibility of CBM and to identify barriers to its fruition. We used a variety of methods in concert (including observation, Rapid Rural Appraisal, a survey, and interviews) to assess the characteristics of the 1) resource, 2) user group, and 3) governing institutions. Our results show that resource and user group characteristics are CBM compatible. The negative influence of all institutional characteristics—particularly impediments to local participation and the prevalence of corruption—makes CBM unfeasible in the study site at this time. We discuss these barriers and their implications. The details of reforms necessary to facilitate CBM and prevent fish species loss are, however, beyond the scope of this study.

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Despite the best efforts of managers and policymakers worldwide, diminishing species and disappearing or degraded ecosystems are clear signs that humans are not using natural resources sustainably. This brings into question the efficacy of conventional top-down strategies that dominated natural resources management in the twentieth century. In response, there is a burgeoning interest - both domestically and internationally - in alternative approaches that devolve decision-making and management responsibilities to local resource users. In the current natural resources management era, grassroots stewardship is paramount to enforced compliance of hierarchical rules. Community-based management (CBM) is a term commonly applied to decentralized, grassroots approaches to natural resources management.

In fisheries management, for example, widespread alarm over the continuing decline in marine and freshwater stocks (McGinn 1998; Newton and Dillingham 1997) has prompted research on the theory and practice of CBM. Considering the suite of possible community-based fishery management benefits—including local-level involvement (Nugent, Wellman and Leibovitz 1996), acceptance and compliance with regulations (Davis and Bailey 1996:261-2), reduced costs for enforcement (Renard 1991:5), and ultimately, sustainable use of fishery resources (Christie, White and Buhat 1994:116)—it is understandable that proponents are anxious to initiate CBM projects. "The greatest impediment to achieving these goals" observed Kenney "may be an 'over enthusiasm' of some of its proponents" (1999:37).

There is a paucity of research and literature exploring the challenges inherent to CBM and acknowledging the complexity involved with putting management in the hands of the local people. In many forums, CBM has received the simplified treatment of *hand it over to the people and they'll do what's best for the resources and their future*. According to Little (1994:349), "An improved understanding of the different social, political, and historical contexts under which local conservation takes place will help debunk the false notion that all communities, if left alone, are able to defend and conserve their resources in a sustainable fashion." CBM proponents must be wary to invest the patience, time, and strategic planning necessary to maximize the probability of long-term, project success. This involves identifying existing

inroads and potential roadblocks during the initial stages of project inventory and design that can help or hinder a CBM effort.

Assessment Framework

To address this research need, we evaluated the feasibility of CBM in a Venezuelan fishery using a *CBM assessment framework* adapted from Gardner and Stern's (1996) checklist of community-management criteria. Gardner and Stern's (1996:130) checklist outlines characteristics of successful CBM initiatives based on themes identified by Ostrom (1990) in her extensive analysis of case studies involving the sustainable use of common-pool resources. Government action at the regional and national levels was the only theme suggested by Ostrom that was not included in Gardner and Stern's framework. Therefore, we added criteria drawn from Gardner and Stern's (1996:134-5) discussion of institutional openness to our framework that assess the characteristics of government and institutions. Gardner and Stern's theme of evaluating rules developed by the user group was not considered because this study assessed a proposed CBM initiative rather than an ongoing project. Willingness to participate was added as a criterion of characteristics of the user group because it is a crucial component of CBM efforts. This point is articulated by Vivian (1991:1):

> Resource management projects, as currently implemented, depend heavily on broad-based cooperation and collaboration because they often rely on the combined actions of individuals which, whether they be planting trees or refraining from overfishing, by their nature cannot easily be coerced or enforced. The willingness of people to undertake the required activities—what is commonly understood as their 'participation'—is therefore essential for the success of these projects.

Our final assessment framework contained criteria grouped into three general themes: 1) characteristics of the resource, 2) characteristics of the user group, and 3) characteristics of government and institutions (see Table 1).

Table 1. CBM Assessment Framework Applied to Feasibility of Community-Based Fishery Management, Portuguesa River Watershed, Venezuela, 1998.

Criteria for Successful CBM[a]	Assessment Method[b]	Indicator Value for Portuguesa River Watershed[c]
I. Characteristics of the Resource		
Resource is controllable locally	- RRA[d]	—
- Definable boundaries	- RRA	+/—
- Resources stay within boundaries	- Observation	—
- Resource can be monitored	- Observation	+
II. Characteristics of the User Group		
Local resource dependence	- Survey	+
- Perceptible threat of resource depletion	- Survey	+/—
- Difficulty of finding resource substitutes	- Observation/Survey	+
- Difficulty of leaving area	- Observation/Survey	+
Presence of community	- Survey	+
- Stable, small populations	- RRA	+
- Network of social interactions	- Observation/Survey	+
- Shared norms for upholding agreements	- RRA/Survey	+
- Local knowledge informs effective rules	- RRA/Survey	+
Willingness to participate	- Survey	+
III. Characteristics of Govt & Institutions		
Devolution of power to local level	- Observation	—
- Government values local knowledge	- Observation/Interviews	—
- Rules are product of participatory choice	- Observation/Interviews	—
- Legal status given to local regulations	- Observation/Interviews	—
Corruption-free, fair enforcement	- Observation/Interviews	—
- Bribes and cheating not permitted	- Observation/Interviews	—
- Selfishness, social elites not awarded	- Observation/Interviews	—
- Government accountable to local users	- Observation/Interviews	—

[a]Criteria adapted from Gardner and Stern (1996) and Ostrom(1990).
[b]Observations, RRA, a quantitative survey, and interviews with key informants were the methods used alone or in concert to evaluate each criterion.
[c]Each criterion is a positive or negative indicator of the current feasibility of CBM in the Portuguesa River fishery.
[d]RRA is an acronym for Rapid Rural Appraisal, a participatory research methodology.

Study Site

The CBM assessment framework is designed to be applicable to a variety of natural resource management contexts. For our study, we used the framework to assess the feasibility of community-based fishery management in a freshwater fishery in the Orinoco River basin in Venezuela, South America. Originating in the Andean piedmont, rivers throughout the state of Portuguesa flow downward into the vast Orinoco River floodplains called the *llanos*. This transition coincides with a marked increase in fish species diversity, from 80 species in the piedmont (Matthews 1998:40-1) to over 200 species in the *llanos* (Winemiller et al. 1996:23). The two distinct physical portions of these watersheds are linked ecologically through the biannual migrations of numerous fish species (Winemiller, Marrero and Taphorn 1996:16,32). We selected the Portuguesa River because it is one of the few commercially important rivers in the Orinoco basin that is not yet dammed. This ensures that fishing practices of fishers upstream and downstream were linked by freely-migrating fish populations.

For generations the well-being and livelihood of fishing communities has depended on exploitation of this fishery resource (Duran 1995:22). Fishery managers and researchers are concerned by a recent decline of commercial fish species, raising questions about the sustainability of current fishing practices and the potential loss of biodiversity if these trends continue (Novoa 1986; Winemiller et al. 1996). This situation makes CBM considerations in the Portuguesa River watershed appropriate from both biological and sociological perspectives. We applied our CBM assessment framework to an in-depth study of fishery management in the state of Portuguesa to evaluate the compatibility of current characteristics of the resource, user group, and governing institutions with CBM.

We studied three villages along the Portuguesa River that were similar in population size, distance from the river, and in their relative interaction with Guanare, the capital city of the state of Portuguesa. Upstream to downstream, the three villages were 1) El Potrero in the piedmont, 2) Quebrada del Mamón and 3) Nueva Florida in the *llanos*. Guanare was the site of most data collection

from government-employed fishery officials and university-based fishery researchers.

Methods

Spanning eight months in 1998, we gathered data in the state of Portuguesa, Venezuela, which we compared to the CBM assessment framework criteria. Each criterion was considered in light of the current circumstances of the Portuguesa River watershed, communities, and governing institutions. We used a variety of methods in concert (including observation, Rapid Rural Appraisal, a quantitative survey, and interviews) to determine if each assessment framework criterion was sufficiently present or absent in the Portuguesa River watershed to be designated as a positive or negative indicator of CBM feasibility. For each overarching characteristic – e.g. resource, user-group, or governance – we considered the cumulative positive and/or negative assessment of the associated criteria and concluded whether or not CBM was possible at present for that characteristic.

Observation

For our Venezuelan case-study, we consistently used observation and descriptive note-taking in the village, institutional, and university environments we encountered. Observation is a qualitative research method that can be used independently, for example by anthropologists in ethnographic research (Frake 1988), or in addition to methodologies used by a variety of research disciplines such as sociology, history, political science, and ecology (Yin 1994:87). Requiring researcher presence at the study site—for example, a village, a corporation, or a forest—observation is less of a skill, than an art that "involves the interweaving of looking and listening, of watching and asking" (Lofland and Lofland 1995:19). Typically, detailed descriptive field notes are taken that enable interpretation and analysis by both the researcher and others at a later time and away from the study setting (Patton 1990:241-2). While the descriptions should be as objective as possible, subjective interpretations, labeled as such by the researcher, are also included in field notes (Patton 1990:241). Observation provides a contextual insight

that is useful for understanding and explaining results of other methods such as quantitative surveys. To avoid bias, triangulation with other methods or with other researchers' observations of the same phenomenon is recommendable (Yin 1994:90-4).

Rapid Rural Appraisal (RRA)

Approximately one month was spent in each village conducting a Rapid Rural Appraisal (RRA). RRA techniques were used to document local knowledge regarding declining fish populations in the Portuguesa River and shed light on the socio-economic and historical factors influencing rural fishery use and river health. A community map, historical profile, Venn diagram, and river-fishery map were made by residents at each site (for details on RRA and its application in the Portuguesa River watershed see Zanetell and Knuth 2002). These RRA techniques are only a sampling of the RRA tools available to researchers for garnering local participation in the research process (Khan and Suryanata 1994; Pretty et al. 1995).

RRA is closely associated with Participatory Rural Appraisal (PRA). The primary distinction is that in RRA, there is a predetermined research agenda or question, whereas in PRA the local participants determine for themselves what questions they will study and the purpose of the research. While RRA typically begins and ends with data collection, PRA is often used to initiate local action and facilitate change (Chambers 1994). Both RRA and PRA aim to engage local knowledge, and this requires recognition that intelligence is not constrained to diploma-bearing scientists and a methodology that serves as a conduit between rural peoples and researchers. Chambers (1992—quoted in Freudenberger 1994:9) stated that the common notion that rural people are uneducated is "an artifact of our ignorance of how to enable them to express, share and extend their knowledge." RRA techniques facilitate local participation in the research process. The hope is that by *involving* people in the research rather than simply *studying* them, the information gathered will be more complete and informative than data generated solely by quantitative surveys (Gill 1993).

Quantitative Survey

A quantitative survey measuring willingness to participate in community-based fishery management was given to 221 heads of households in the Portuguesa River watershed. Based on a literature review, observations, and the RRA, we constructed scales to measure the influence on the dependent variable willingness to participate of five independent variables: 1) dependence on the fishery; 2) perception about the state of the fishery; 3) level of concern about the fishery; 4) perceived locus of authority over the fishery; and 5) sense of community. Responses to scale items as well as mean scores for the 16-item sense of community scale and the 6-item willingness to participate scale contributed to the evaluation of several of the CBM assessment framework criteria.

Sample-size. We calculated the sample size for each village using the following criteria: 1) each village had a finite population determined by the number of households; 2) the outcome of the response variable—Willingness to Participate—is binary across the villages (i.e. willing or not willing); and 3) the test for significance is set at the .05 level; with 4) a power to detect differences of 0.15 between villages. These criteria required a sample of 80 households in El Potrero, and 65 households in each of Quebrada del Mamón and Nueva Florida. We used a random numbers table (Ott 1993:A-23) to generate the sample for each village. We actually surveyed 81 households in El Potrero, 66 in Quebrada del Mamón, and 74 in Nueva Florida. In each village, only 1-3 households refused to participate in the survey. These refusals were handled by substituting the declining household with the nearest house not already selected as part of the random sample. We questioned the head of each participating household for a total of 124 adult male respondents and 97 adult female respondents.

Survey enumeration and analysis. To make the survey as understandable as possible to respondents, we pre-tested item content and word usage with a group of Venezuelans who regularly fished in the Portuguesa River but did not live in any of the study sites. The final survey was given orally in each site by a group of 10 young men and women from the three villages who attended the university in the city of Guanare. Response validity was high because it was difficult to mislead the assistants who had them-

selves grown up along the Portuguesa River. Surveys in each village were given in a concentrated two-day effort. Survey training was done the first morning of each site visit. A "round-robin" training technique (Weinberg 1983:343-7) taught correct voice level and pace, probing without leading, and how to record responses. We analyzed survey data using an SPSS 1999 statistical software package for social science research.

Interviews

Observation and recommendations lead to the identification of 25 key informants from village, government, and academic sectors that were not only knowledgeable about the fishery, but also respected by their peers. Yin (1994:84) suggests that key informants are those individuals whose insights critically inform the current case-study as well as future inquiry. From the three villages, a total of 15 key informants were interviewed. Of these, nine were village elders (all male) and six were adults between the ages of 35 - 50 years old (three male, three female). From the Universidad Nacional Experimental de los Llanos Occidentales "Ezequiel Zamora" (UNELLEZ) in Guanare, State of Portuguesa, five scientists were interviewed as key informants (two male, three female). The Ministry of Agriculture and Livestock (MAC) and the Ministry of the Environment and Renewable Natural Resources (MARNR) are the two government agencies involved with fishery management in the state of Portuguesa. From these agencies, five key informants were interviewed (four male, one female).

Each key informant was interviewed in a familiar setting (Yow 1994:57) for 1-2 hours. We encouraged interactive conversation (Albrecht, Johnson and Walther 1993) and probe questions (Patton 1990:324-7) ensured that a "guided conversation" (Lofland and Lofland 1995:85) occurred on the theme of CBM feasibility. Notes taken during interviews were augmented immediately following to capture all significant information. All quotes in this text are in English although some interviews were conducted in Spanish. Translations represent as closely as possible the original content and intent of the interviewee. Key informant opinions are in response to the current situation in the state of Portuguesa and do not

necessarily reflect the state of fishery management and the feasibility of CBM in other sectors of Venezuela.

Results: Characteristics of the Resource

Resource Is Controllable Locally

The results of the RRA map-making activities indicate that biannual spawning migrations in the Portuguesa River—some more than 200 kilometers from the piedmont to the *llanos* (Winemiller et al. 1996:23)— will require coordinated local control between fishing villages throughout the watershed. This added complexity is a negative indicator of the feasibility of CBM in the Portuguesa River watershed.

Definable Boundaries

The Portuguesa River has definable physical boundaries indicated by fishers on RRA maps and corresponding to official topographic maps (Dirección de Cartografía Nacional 1975). Fishers in each village demonstrated a thorough familiarity and understanding of the physical characteristics of the river and seasonal factors influencing fish activity within the stretch of Portuguesa River they fished most frequently. The challenge, however, is that fish migrate upstream and downstream of each village's normal fishing boundaries. "Migratory fish populations cover areas many orders of magnitude greater than those of proposed or traditional property boundaries" (Welcomme 1985—cited by Bayley 1992:7). Therefore, definable boundaries are positive indicators, at the local level, and negative indicators, at the watershed level, regarding CBM feasibility.

Resources Stay Within Their Boundaries

In addition to natural migrations in and out of local boundaries, the movements of fish are subject to market demands. Fish caught by subsistence fishers normally stay in the basin of origin, whereas fish harvested by commercial fishers are transported by middle-men to markets throughout Venezuela. Increasing demand for fish in the

Venezuelan markets has prompted rural fishers to increase fishing pressure (Duran 1995:22) on the fish species of most concern to fishery managers (Duran 1995) and researchers (Winemiller et al. 1996) as being threatened with extinction. Therefore, the fish species in most critical need of protection are the most likely to be removed from the basin they inhabited. The exportation of fishery resources from their local boundaries is a negative indicator of the feasibility of CBM in the Portuguesa watershed.

Changes In The Resource Can Be Adequately Monitored

Information gathered by villagers during daily fishing trips inform continual assessments of fish stock status and factors influencing fishery health. These assessments were far more accurate than judgments made by fishery inspectors located in central offices (personal observation 1998). Family ties and neighbor relationships were conducive to information sharing between villagers of new conditions and changes in the fishery. This communication network is an indication that the local users currently monitor the fishery for their own benefit, and would be able to do so for the purposes of community-based management. The capacity to monitor resources locally is a positive indicator of the feasibility of CBM, although comprehensive monitoring of migrating fish populations will require establishing communication networks between all Portuguesa River fishing villages.

Results: Characteristics of the User Group

Local Resource Dependence

From all three villages, 54 percent of survey respondents agreed with the statement: "Your ability to provide food for the people in this house is dependent on living near the Portuguesa River." Of all respondents, 46 percent agreed that "the money you make is dependent on living near the Portuguesa River." These results indicate that at least half of the current watershed residents would be affected negatively by the loss of the fishery and that continued availability of this resource plays a vital role in watershed socioeconomic stability. This demonstrated reliance on the Portuguesa

River fishery is a positive indicator of the feasibility of CBM.

Perceptible threat of resource depletion. Of all the households surveyed in the Portuguesa River watershed, 75 percent believe that there are less fish than in the past, 69 percent hold that average fish size has decreased, and 83 percent stated that they catch less fish in one hour with a cast net today than in the past. Despite these warning signs of impending fishery collapse, concurrent local concern is lacking because fish remain sufficiently abundant to support commercial and artisanal fishing (personal observation 1998). Therefore, perceived resource depletion is considered both a positive and negative indicator of the feasibility of CBM.

Difficulty of finding substitutes for local resources. Gardner and Stern (1996) held that community management efforts are typically more successful where the natural resource of concern cannot be replaced with a functionally-comparable or socially-acceptable substitute. In Venezuela, there is not a national reliance on the Portuguesa River commercial fishery. There is, however, local reliance on the fishery as a food source, particularly of protein (Chapman 1979:38; Novoa 1986:184). Of all households surveyed, 84 percent participated in subsistence fishing. The difficulty of finding substitutes for the fishery is a conservation incentive to local users and thus a positive indicator of the feasibility of CBM in the Portuguesa River watershed.

Difficulty or expense attached to leaving area. Related to resource substitutability is the issue of whether or not an occupational substitute exists for the fishers (48 percent) who depend on commercial fishing in the Portuguesa River as their principal income. A government report (Agüin 1997:7) stated that the lack of employment options in Venezuela is limiting the opportunities of village fishers to find work elsewhere, attracting outsiders to join the ranks of local commercial fishers, and accelerating fishing pressure in the Portuguesa River. Statistics in a 1997 national report on sustainable development (Bohórquez, Chacin and Viana 1997:9) illustrate a deepening rift in Venezuela's population of over 22 million people between a rich minority and a poor majority:

- 60 percent of urban residents live in impoverished conditions,
- the "poverty index" (the sum of unemployment rates and

consumer inflation rates) rose from 8.6 percent in 1970 to 52.2 percent in 1993,

- the percentage of homes in poverty climbed from 36 percent in 1984 to 62 percent in 1993, and
- the percentage of homes under extreme poverty, that is, unable to cover the cost of basic food, increased from 11 percent to 33 percent during the same period.

These statistics suggest that the Portuguesa River fishery provides a higher level of food and income security than could be found by the watershed residents if they were to search for work in other areas of the country. This is an incentive for villagers to fish sustainably. The difficulty and expense of leaving the area is a positive indicator of CBM feasibility in the Portuguesa River watershed.

Presence Of Community

As its name implies, community-based conservation is rooted in the concept of community. According to Gardner and Stern (1996:143), "there is a connection between community resource management and the strength of community feeling." In our survey, a 5-point scale measured sense of community where a score of 5 was high and a score of 1 was low. The mean score of all households surveyed was 4.2, suggesting a widespread and high sense of community in the watershed, which is a positive indicator of the feasibility of CBM in the Portuguesa River watershed.

Stable, usually small population. A discussion coincident to RRA community map-making suggested that the population of each village grew rapidly in the 1960s following a governmental land reform program that encouraged settlement and development of Venezuela's rural areas (Smith 1974). Following this influx and growth, villagers stated that the populations of each village have remained relatively stable. In 1998, the number of households in El Potrero was 125, in Quebrada del Mamón was 90, and in Nueva Florida was 92. These stable and small village populations are positive indicators of CBM feasibility.

Thick network of social interactions. Observations indicate that extensive familial relationships and kinship ties in the three villages have existed for generations (personal observations 1998).

Two questions from the sense of community scale also demonstrate the extent of villager interactions and social interdependence. To the question "The friendships and associations you have with other people in your village mean a lot to you," 86 percent of households surveyed in the three sites combined agreed. Villagers were also asked, "You regularly stop and talk with people in your village" to which 80 percent agreed. The responses to these questions show that there is a high level of village networking and connection. The results of these survey questions and direct observations in the villages merit the designation of a network of social interactions as a positive indicator of the feasibility of CBM.

Shared norms, especially norms for upholding agreements. In the three villages, 80 percent of surveyed households responded that they agree with other villagers about what is important in life, indicating shared norms. During RRA activities, the Neighborhood Association in each village was identified as vital to conflict resolution, the organization of community activities, and for facilitating compliance with community agreements. The existence of shared norms and community organizations for upholding agreements is a positive indicator of the feasibility of CBM.

Resource users have sufficient local knowledge of the resource to devise fair and effective rules. RRA river-fishery maps illustrated detailed familiarity with the ecological and seasonal processes affecting fish species behavior and fishing activities in the Portuguesa River watershed. Clearly, the breadth and depth of this local knowledge can inform conservation plans and is a positive indicator for successful future CBM.

Willingness to participate. In our survey, a 5-point scale measured willingness to participate where a score of 5 was high and a score of 1 was low. The mean response of all households surveyed was 4.04, suggesting that residents were very willing to participate in localized fishery protection efforts. Considering the scale items singly, 81.5 percent of respondents said they were willing to participate in CBM efforts, 84 percent were willing to work with other people from their village in such conservation efforts, and 67 percent were willing to work with people from other villages in the watershed. These results are important because the resource control assessment suggested that migrating fish populations require coordinated watershed management. Therefore,

willingness to participate at both the local and watershed level is a positive indicator of the feasibility of CBM in the Portuguesa River watershed.

Results: Characteristics of Government and Institutions

Devolution of Power to Local Level

Community-based fishery management is possible to the extent that the laws and government allow it to be. The willingness of governing agencies and institutions to devolve power is as important as the willingness of the people to participate. Studies in Colombia (Lowenstein 1989) and in the Caribbean (Renard 1991) have revealed that local-level natural resource management projects have been limited by centralized government policies and regulations that perpetuate "a tradition of non-participation" (Renard 1991:6). This appears to be the case in Venezuela where the current, top-down management of the freshwater fisheries dates back to the laws established by the 1944 Law of the Fishery (Ley de Pesca 1944). State and regional natural resource managers are charged with enforcing rules made in Caracas that do not incorporate the unique needs and characteristics of the varying watersheds they oversee.

Due to the variable timing of spawning migrations and the site-specificity of fish assemblages, standardized application of gear restrictions and closed seasons can deleteriously affect fish populations. Research indicates that although certain fish species are found throughout the *llanos*, a vast number of fish species occur only in local settings (Lilyestrom and Taphorn 1983; Taphorn 1989; Winemiller 1991:12). One study showed that within a Venezuelan watershed, neighboring streams shared less than 50 percent of their species (Taphorn 1989). These data emphasize the need for site-specific fishery management that utilizes the input and experience of local residents and fishers. Yet, fishery researchers and government managers perceive local people as being incapable of running the fisheries effectively and sustainably. Governmental hesitation to devolve power is a negative indicator of CBM feasibility in the Portuguesa River watershed.

Government Values Local Knowledge. Even though the utility of local knowledge to fisheries management has been dem-

onstrated (Christie et al. 1994:105; Neis 1992; Ruddle 1994:28), government officials and fishery researchers often dismiss local knowledge as anecdotal and unscientific (Johannes 1981:ix; Neis 1992:166).Thus, a major challenge to CBM is government acknowledgement that local users have knowledge of experiences with, and connections to the fishery that give them management insight and long-term commitment to the resource. This will not be easy:

> Perhaps the most critical or difficult task is to reform governmental institutions. It is difficult because it demands that we dispel the myth that governments have the exclusive mandate and capability to manage common property resources. (Renard 1991:7-8)

In Venezuela, a fear of the "tragedy of the commons" (Hardin 1968) pervaded the management hierarchy and contributed to a widespread belief that the future of the fisheries lies in stronger rules and tougher enforcement (Agüin 1997:6; Bohórquez et al. 1997:40; Duran 1995:58; MARNR 1996a:42-43; Sanchez 1989:7). During interviews, government officials reacted negatively to proposed CBM:

> It's impossible! [The fishers] aren't able to care for the fishery because they are trying to catch as many fish as they can. If a fisherman is able to catch 5 kilos, he isn't going to take only 3 and leave 2 kilos for tomorrow. He's going to keep them all. (GN1, personal communication, July 1998)[1]

A government fishery researcher concurred:

> If the fishermen had control of the fishery, there would be no control. Putting them in charge would be the end of the fishery. (GN2, personal communication, July 1998)

[1] Codes used in place of interviewee names to maintain confidentiality.

In contrast, a respected leader and fisher in the Portuguesa River watershed held that local knowledge enables fishers to manage the fishery more sustainably than the current top-down system:

> We're the ones who know the river. We know the movements of the fish, the rise and fall of the river. We know where they put their eggs and when to find them there. We know what we need to know to catch the fish, and we know what needs to be done to protect them. The fishermen are the only hope for the fish in the Portuguesa River. (QM1, personal communication, July 1998)

The current lack of government faith in fisher management capacity is a negative indicator of CBM feasibility in the Portuguesa River watershed.

Rules are a Product of Participatory Choice. Management reliant on enforcement and policing is often ineffective where 1) funding and personnel are limited and 2) the resource base is vast and/or populations are migratory. This is the situation in Venezuela where top-down fishery management hinges on encounters between a limited number of the National Guard (enforcers) and fishers (local-users). Compliance that relies on fear/probability of being caught, combined with pervasive bribery and corruption, has contributed to unregulated fishing in Venezuela. Thus, participation of user groups in natural resource management is critical. According to Gardner and Stern (1996:133), "rules that work are, first of all, the product of participatory choice: Most of the people who must abide by them have had a say in making and modifying the rules." If the resource users are involved in the creation of rules, then the rules will be perceived as more legitimate (McCay and Jentoft 1996:243). If fishers are responsible for enforcement, issues of community commitment and individual status in the village can influence fisher behavior rather than just fear of punishment. Participation in both decision making and regulatory enforcement can increase compliance (Davis and Bailey 1996:261-2).

Reflecting on regulatory inefficacy, a Portuguesa River fisher agreed that compliance would increase if fishers were responsible for supervising themselves:

> If we - the fishermen - had more responsibility for managing the fishery, it would be a very different story. First, it would be almost impossible to fish illegally without being discovered. Where can I go fishing that I won't run into one of my neighbors fishing as well? And I have respect for my neighbors. If they make the rules, and then find me breaking them, I am going to feel ashamed. (QM1, personal communication, July 1998)

This supports research that involvement of the user groups in the formation of laws and regulations increases both acceptability and compliance (Davis and Bailey 1996:261-2). Gardner and Stern (1991:137) provided this explanation for the fisher's attitude: "It only makes sense for an individual - even one who cares about the group - to exercise self-restraint if there is reasonable assurance that others will do the same." In the state of Portuguesa, the lack of fishery rules that are the product of participatory choice is a negative indicator of CBM feasibility.

Legal Status Given to Local Regulations. For CBM to occur "legal instruments are needed to provide the basis for the transfer of management responsibility from a central government agency to community organizations" (Renard 1991:6). Given the prevailing centralized approach, Venezuelan fisheries lack a legal framework legitimizing management decisions and processes at the local level. In the state of Portuguesa, the situation is made worse by a perceived triviality of existing regulations, further justifying the development and testing of locally-devised rules. According to a university researcher:

> The current laws are to blame for [the declining Portuguesa River fishery]. These laws exist on paper, but that's the extent. There is a lack of people to enforce the laws, and those that are [enforcing the laws] can typically be given some money to leave the fishermen alone. (UNZ1, personal communication, February 1998)

Rule-bending and corruption at higher levels contributes to a perceived lack of regulatory credibility. This further suggests that rules made at the village level may be more widely accepted and upheld by fishers, yet there is an absence of legal avenues for the creation of such local initiatives and regulations. In his evaluation of stewardship programs by private landowners, Cox (1995:245) observed that "while the enthusiasm of the individual on the land is critical, so is... the passage of legislation that institutionalizes the mechanisms and arrangements needed for proper and comprehensive support of such a stewardship program." The lack of legal status lending credibility and stability to local initiatives is a negative indicator of the feasibility of CBM in the Portuguesa River watershed.

Corruption-Free, Fair Enforcement

The importance of enforcement that is just, administered equally throughout a society, and free from corruption is emphasized by community management researchers (Gardner and Stern 1996; Ostrom 1990). Such a regulatory high-road is not currently found in the Portuguesa River watershed, counting as a strike against CBM feasibility.

Bribes and Cheating Not Permitted. Bribery is common between fishers and regulators in the Portuguesa River fishery:

> The laws mean nothing as corruption is commonplace within the government and managing agencies. Rather than enforcing the laws, the National Guard uses them as a means to manipulate the people into paying them money. Therefore, there is absolutely no emphasis on conservation. (UNZ1, personal communication, June 1998)

A Portuguesa River fisher described the enforcement of fishing regulations by the National Guard and the consequences that corruption has had on fishing activity and compliance:

> Now, I can go out and fish illegally day and night – using weir seines, snag lines, and poison – risking

> only an encounter with the National Guard who I can pay off. And it makes no difference to me what [the National Guard] think of me because I have absolutely no respect for them... Each one can be bought for a price. (QM2, personal communication, July 1998)

The fisher's remarks demonstrate how the occurrence of bribery has weakened user group respect for the regulatory system and, consequently, the effectiveness of these regulations and enforcement in encouraging legal fishing practices. The current prevalence of bribing and cheating is a negative indicator of the feasibility of CBM in the Portuguesa watershed.

Selfishness and Social Elites Not Awarded.. In the Portuguesa River fishery corruption often favors wealthy and politically powerful resource users. "This rewards the selfish at the expense of the resource and the people who depend on it" (Ostrom 1990-cited by Gardner and Stern 1996:134-135). One fisher summarized:

> It is an unfair situation because the poor man, who is trying to find food and money for his family, is the man that suffers. The people without money are the people that the National Guard makes comply with the laws; they take their cast nets and their catch. But the rich man is the man who is able to do anything without consequence. If he takes along [$2-$10 dollars], he's able to pay the National Guard for fishing illegally. It is a system in which a few gain and the majority lose. (NF1, personal communication, July 1998)

Even Portuguesa state fishery employees are affected by corruption in the government:

> Our fishery management is failing because the people in charge are augmenting their salaries with money that we need to protect the fishery. Each year we have less and they have more. Corruption. The people that are taking our money think only of

> the money and don't think of how they are destroying a river. (GN2, personal communication, July 1998)

A centralized management system that rewards selfishness and social elites is a negative indicator of CBM feasibility in the Portuguesa watershed.

Government Accountable to Local Users. Another indication of devolution necessary for CBM is that resource users have sufficient political clout - regardless of their socio-economic status - to hold natural resource managers and government accountable for their management decisions and the subsequent consequences. "Successful management requires that a high degree of decision making and accountability be shared by fishers and government officials" (McGinn 1998:9). The combination of an exclusive, top-down management hierarchy and a growing rift between Venezuela's richest and poorest members of society (Bohórquez et al. 1997:46) has led to an overall inability of the rural populations to contribute to management decisions. This includes families living in the small, isolated fishing villages in the Portuguesa River watershed. The United Nations Research Institute for Social Development (UNRISD) reports that "typically in most poor countries, and in many rich ones for that matter, the weaker and impoverished groups... have little voice and a limited role in influencing government" (Ghai 1988:25).

Factory pollution in the Portuguesa River watershed provides an example of an alliance between the upper levels of Venezuelan society and the inability of rural villagers to voice concerns and affect change (for details see Zanetell 1999). Research has documented that untreated effluent from a sugar cane distillery has significantly lowered dissolved oxygen levels in the Portuguesa River (Hernández 1992:6-7; Winemiller et al. 1996:27) inducing fish mortality during peak periods of alcohol production. Since the distillery opened in 1988, legal wastewater standards have not been met (MARNR 1996b) and local fishers have repeatedly reported fish kills to the government to no avail. A water quality expert in the state of Portuguesa observed:

> To have power, one needs to have money... The fishermen that are discovering these disasters and dead fish have neither money nor influence. Here in Venezuela, there is nothing that the poor fisherman is able to do except watch the river dying. (UNZ2, personal communication, July 1998)

This lack of status and power makes it difficult for rural fishers to hold natural resource managers and government officials in the state of Portuguesa responsible for their decisions and actions. The current lack of accountability is a negative indicator of CBM feasibility in the Portuguesa River watershed.

Conclusion

The results of our application of the CBM assessment framework to the Portuguesa River fishery suggest that while resource and user group characteristics lend themselves to CBM, its feasibility is severely limited by the negative influence of all government and institutional characteristics. The following discussion of the major challenges and barriers to CBM is based on the characteristics of the Portuguesa River fishery at the time of the study and stakeholder opinions quoted here were in regard to the study site only. Keeping the scope of the research in mind, it is plausible that the implications and recommendations of this study may shed light on other CBM projects and proposals in contexts where inter-community coordination is required and/or similar barriers of corruption and socio-economic/cultural divisions exist.

For the characteristics of the resource, the assessment framework indicates that community-based stewardship of migrating fish populations will be challenging, requiring coordination among Portuguesa River watershed villages. However, the positive assessment of all the user group characteristics suggests that resource challenges are surmountable. Villager fishery dependence, sense of community, and willingness to participate in community-based conservation efforts complement monitoring skills and resource familiarity that lend themselves to watershed level fishery management.

The potential for inter-village coordination in the Portuguesa River Watershed does not suggest that similar inter-community communication and cooperation would be likely or even feasible in other watersheds with different cultural and/or socio-economic characteristics. Davis and Bailey (1996) caution against assumptions of internal harmony or equity within fishing communities. It is logical that any conflicts emanating from such internal differences would be exacerbated at the watershed - i.e. multi-community - scale. Wade observed that both cooperative and individualistic village societies exist (1988:2-3). Whereas the former could help inter-village coordination, the latter could hinder the efficacy of a watershed level CBM effort. The challenge of inter-village coordination, especially in non-cooperative circumstances, is an important aspect of CBM feasibility in river systems and of migratory fish populations. This challenge and how the degree of inter-community coordination required may differ depending on the type of fishery (e.g., lake, coastal, migratory, non-migratory, etc.) is an area that merits further research.

The assessment framework also illustrated that the current characteristics of the government and institutions are significant barriers to CBM feasibility in the Portuguesa River fishery. In particular, a top-down, regulatory hierarchy is not conducive to local participation and systematic corruption precludes sustainable resource management. In regard to the barriers to participation, the situation in the Portuguesa River watershed reflects conclusions of the United Nations Research Institute for Social Development (UNRISD) about community-based efforts generally: "Despite its promising potential, the participatory approach to development has made little headway in official programmes and policies at the national or international levels" (Ghai 1988:27).

Government resistance to devolving power is a common phenomenon, especially in developing nations with longstanding socio-economic/ethnic divisions between the haves and have-nots (Freire 1970; Ghai 1988:25; Renard 1991).

> Existing social, economic, political and cultural relations within communities and between communities and government or NGOs are often highly resistant to change, precisely because they serve the

> interests of those who play a key role in defining and maintaining these relations... Most individuals, communities, projects and organizations fear change because of the potential for conflict, as well as the possible attendant loss of power, which this involves. (Leurs 1998:133)

The fruition of grassroots stewardship requires a climate of institutional openness in which traditionally dominant segments of a population empower the traditionally voiceless to have legitimate and meaningful input to the management process. Yet such a climate is not possible if the current notion prevails that local people are to be controlled by rather than included in management. Dismantling this notion and reforming Portuguesa River fishery management will not be quick or simple:

> In the final analysis, resource management is a political process determined by factors of ideology, political economy and social relations. [CBM approaches] clearly seek to contribute to a process that promotes social equity, respects popular needs and wisdom, and maintains cultural integrity and sovereignty. It is therefore not surprising that these orientations would meet with opposition where there is fear of such a process releasing new talents and redistributing power and responsibilities. Institutional change will be slow, but it remains indispensable to achieve the goals of resource management and community development. (Renard 1991:9)

Yet, fear of and resistance to restructuring Portuguesa River fishery management should not overshadow the potential benefit of incorporating the assets of local users in sustainable resource management: from their detailed knowledge about the resource, to their stake in its continuity, to their potential role in rule formulation and enforcement.

Enabling local participation is one of the major barriers to CBM of the Portuguesa River fishery. Overcoming corruption in

the management hierarchy is another. Bribery as the dominant mode of operation is illustrated by a researcher's observation:

> It is a game of sorts that the fishermen and National Guard play with each other, exchanging favors for money and fish. (UNZ1, personal communication, June 1998)

A fisher concurred that fishery management of the Portuguesa River:

> . . . is like a game. From what I've seen, the National Guard has no interest in ending the game because there is money involved. It isn't in their interest to share control of the fishery with us, because it means less money for them. (EP1, personal communication, July 1998)

The research of Susan Rose-Ackerman suggests that the interest of the fishermen and of the National Guard in playing the game of corruption stems from the same self-interest that universally motivates human behavior, albeit with different outcomes in different contexts. In her examination of the causes and consequences of corruption in different countries throughout the world, Rose-Ackerman (1999:2) asserted that:

> . . . the motivator is self-interest, including an interest in the well-being of one's family and peer group. Critics call it greed. Economists call it utility maximization. Whatever the label, societies differ in the way they channel self-interest. Endemic corruption suggests a pervasive failure to tap self-interest for productive purposes.

Rose-Ackerman continued that "self-interest and the public interest frequently conflict" (1999:225). For example, while the fisher (briber) and the National Guard (recipient) are the short-term beneficiaries, it is at the long-term cost of the Portuguesa River fishery, and ultimately, biodiversity. For this reason alone, intervention in

the current system of fishery management is justified, especially if, as Rose-Ackerman hints, there are avenues for harnessing the potential positive outcomes of self-interest.

Despite the difficulty of reducing corruption in Portuguesa River fishery management, this challenge should be faced in Venezuela to prevent the prediction that the "Portuguesa River is finished" (UNZ2, personal communication, July 1998) from becoming a reality rather than just a speculation. We do not claim to know how reform should occur, but policy and institutional adjustments should be based on a thorough understanding of the historical, political, cultural, economical and sociological dimensions of the Venezuelan freshwater fishery. Clearly, corruption is highly contextual and such information is a necessary foundation for reform, yet we should be mindful of Rose-Ackerman's observation that "culture and history are explanations, not excuses" (1999:5).

In response to fishery collapse, fishery officials and researchers in the state of Portuguesa are advocating for stricter rules and tougher enforcement (Agüin 1997:6; Duran 1995:58; MARNR 1996a:42-3; Sanchez 1989:7). Unless corruption is dealt with first, increased top-down regulation may exacerbate the problem by providing the National Guard and fishermen, both well-entrenched in the bribery game, more opportunities to exploit the fishery for personal gain. The bottom-line in eradicating corruption, according to Rose-Ackerman, is economical: reform must eliminate existing monetary incentives for bribery.

> Enforcement and monitoring are needed, but they will have little long-term impact if the basic conditions that encourage payoffs are not reduced. If these incentives remain, the elimination of one set of 'bad apples' will soon lead to the creation of a new group of corrupt officials and private bribe payers. (Rose-Ackerman 1999:6)

In sum, our CBM assessment framework not only allowed us to evaluate the current feasibility of community-based fishery management in the Portuguesa River watershed in Venezuela, but also enabled us to identify the primary challenges and barriers to its fruition. The challenge of inter-village coordination appears sur-

mountable in the Venezuelan context. More significant barriers include a lack of avenues for local participation in fishery management and corruption throughout the regulatory system. These obstacles must be overcome to prevent declining fish species from succumbing to the irreparability of extinction. Our study focused on identifying these CBM barriers and discussing their implications. The details of reform necessary to facilitate CBM are beyond the scope of this study. McCay and Jentoft (1996:246) aptly remarked that "in fisheries management there is no clear-cut, once-and-for-all, practical solution to the question of institutional design." It is apparent, however, that the collective knowledge of fishing villages and local fishers is the last untapped resource awaiting exploration and discovery in Venezuela.

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