

**Community-Based Resource Control And Management In Amazonia:
A Research Initiative To Identify Conditioning Factors For Positive Outcomes¹**

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8th IASCP Conference, Bloomington, IN 31 May – 4 June, 2000

I. Introduction: Community-based Natural Resource Management in the Amazon

The Amazon Community-based Natural Resource Management (CBNRM) Research Initiative (ACRI) is a multi-disciplinary effort to improve our understanding of the factors that condition positive outcomes in community-based initiatives to manage natural resources and/or landscapes in a sustainable way. The research is focused on initiatives in rural communities that can be characterized as “traditional” in the Amazonian portions of Peru and Brazil.² ACRI is a process that combines case studies of four different community management efforts, rapid assessments of initiatives in eight other communities and a dialogue among the members of the research teams and those of a Steward’s Committee.³ ACRI expects to use its findings to strengthen CBNRM efforts in the Amazon on two fronts: through dissemination and discussion of the results and recommendations with community organizations, NGOs, funding agencies and government agencies; and through advocacy work to improve the legal and political framework for CBNRM. ACRI is sponsored by four institutions from Brazil, Peru and the United States⁴ and is currently finishing the first two case studies.

¹ The author wishes to thank the members of the ACRI Stewards Committee for their input in defining the working definitions and research questions. Also he wishes to give special thanks to Daniel Nepstad, David McGrath and Georgia for their comments on the paper. We gratefully acknowledge the financial support of the Ford Foundation and the PPG7-PPD (Ministry of Environment, Brazil) Research Program.

² These include communities of indigenous peoples, rubber tapers/brazil nut gatherers, and ribereños/fishermen who have lived in tropical forest communities for at least several generations. Because of our emphasis on community institutions and organizational experience, we have not included the relatively new communities of recent colonizers, although we believe that many lessons learned through ACRI will be applicable to colonist communities.

³ There are five members of the research team and 12 members of the Stewards Committee. The latter represent the sponsoring institutions plus three universities and an independent research institution. Among the two groups, there are 10 different academic disciplines represented.

⁴ These are the Instituto de Pesquisa Ambiental da Amazônia of Belem, Brazil, the Instituto del Bien Común of Lima, Peru, Oxfam America, Inc. of Boston, MA and The Woods Hole Research Center of Woods Hole, MA.

Conservation and Development in the Amazon Since the mid-1980's, the world governments have been under pressure to liberalize their economies, by implementing structural adjustment programs, removing trade restrictions, and diminishing the role for government; this culminates an historical trend towards increasing reliance on the market place as the principal regulator of human economic behavior. Under this ideological regime, the collective will and the common good, whether expressed at the community, municipal, or state level, have ceded ground to individual initiative, accumulation, and consumerism as expressed through the laws of supply and demand. The rapidly growing dependence on what the global market economy offers has undermined a large number of local traditional economies based on a diversity of more sustainable subsistence strategies. Established patterns of common-property resource use have given way to booming land and resource markets in which private land parcels and government resource concessions of increasing size and value are traded to the highest bidder. As the rural landless grow in numbers, they fill the ranks of the urban jobless or move to the few forested frontiers left, like the Amazon Basin.

Current development trends in Amazonia encourage patterns of tenure, extraction and use for its renewable natural resources that increase human poverty and lead to environmental degradation. Since the early 1980's a major effort has been made to protect and preserve areas of the Amazon forest from ecological deterioration by creating national systems of parks and reserves; a great deal of international funding has been invested in this effort, principally to shore up government conservation agencies and the police force in charge of patrolling the protected areas (Terborgh 1999). Despite this international effort and the creation of many new parks and reserves, only an estimated 6-7% of the surface of Amazonia has been protected in these national systems.⁵

The model of protected areas that has been implemented in Amazonia has been widely criticized as unmanageable and anti-social. In the first place, critics argue that government agencies, even in the best of cases, do not have the professional and physical capacity, or in many cases the political will, **Error! Bookmark not defined.** to administer and protect such vast and inaccessible areas. Second, the protected areas model implemented until recently for most of the Amazon is one of

⁵ In the case of Brazil, the 154 conservation units located in the "legal" Amazon represent 8.0% of the total area, discounting Extractive Reserves and protected areas superimposed on other areas of national interest (Instituto Socioambiental 1999.) In Peru, the 8 protected areas of the Amazonian portion of the country represent 6.3% of its area (INRENA 1998).

complete exclusion of the local population, in both the sense of physical exclusion from the area and that of political exclusion from protected area management (Alcorn 1993; Chirif *et al* 1991; Smith 1996) ⁶. There are many cases in which parks and reserves, established from maps in the capital cities, included indigenous peoples or settlers unbeknownst to the government officials drawing the boundary lines. This second situation had resulted in tension, conflict and in many cases “illegal” occupation and extraction of lands and resources within protected area boundaries. Fortunately, conservationists are changing their approach in Latin America; initiatives are underway in some areas to develop management plans for protected areas that take into account both the needs of the local population and their participation in the implementation of the plan (Ulfelder *et al*, 1997; PALOMAP II 1998; Freudemberger 1997).

Community Efforts to Manage Resources An estimated 40% of the forests of Amazonia is claimed, occupied and/or used by indigenous, traditional and recent immigrant communities. Although in some cases, official recognition of these claims has not been forthcoming, this still represents six or seven times the area under park or reserve protected status. In the case of Brazil, the 370 different indigenous areas located in the “legal” Amazonia, with 102 million hectares claimed, titled or in process of titling, represent 20.4% of the total area. (ISA op.cit.). In the case of Peru, an estimated 56 different indigenous peoples living in 1200 communities have title and exclusive concessionary rights to about 10.35% of the total Amazonian region. A recent estimate (See Table 1) doubles that figure for the future when all areas currently occupied, including an additional 3-400 currently unrecognized communities, would be sanctioned officially (Benavides and Smith, in press; GEF *et al* 1997).

Table 1 Estimated area under future property and management of indigenous Amazonians in Peru

Has. Titled and reserved	Has. to be titled or reserved	Total estimated Has.	% Peruvian Amazon
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⁶ See also “Indigenas Bolivianos marchan 750 km. para presentar sus demandas territoriales al Presidente del pais” in Chirif *et al* 1991. pp. 185-195. “La COICA establece alianza con ambientalistas en defensa de la Amazonia” in Op.Cit. pp 175-183.

7,759,536	8,983,275	16,742,811	21.93%

How this 40% is used or misused is extremely important for the future of the Amazon forests and hydrologic system as a whole. Our knowledge accumulated over the past several decades regarding how the traditional Amazonians manage their resources suggests that these forest-dwelling communities may hold great promise for reconciling community development and empowerment goals with ecosystem conservation goals (Anderson 1992; Nepstad and Schwartzman 1992; Posey and Balee 1990).

Since the early 1980's, a number of NGOs and local communities around South America are making efforts to learn from traditional practices and to develop new norms and plans for managing common forest resources for both market and subsistence use (SUNY 1998). Oxfam America has collaborated with several of these including the Lomerio Chiquitano in Santa Cruz, Bolivia beginning in 1985 (Olivera 1995 Houghton and Hackler 1996), the Mojeños and CIDDEBENI in the Chimanes Forest, Bolivia beginning in 1987 (Lehm and Krudenecky 1995), and Peru's Yanasha Forestry Cooperative since its inception in the early 1980's (Lazaro *et al* 1993; Benavides and Pariona 1995; Gram *et al* 1994). WHRC and IPAM have collaborated closely with non-indigenous river folk in Brazil along the lower Amazon at Santarem (McGrath *et al* 1993), with *cabocolos* and recent settlers along the Rio Capim, Paragominas (Mendonca *et al*) and with rubber tapers in the Chico Mendes extractive reserve, Acre (Nepstad *et al* 1992; Brown *et al* 1995).

We are well aware of the dangers of romanticizing either the "ecologically-noble savage" or the idyllic rural community (Redford 1990; Agrawal 1997; Smith and Wray 1996). The task of community-based management of natural resources is very complex indeed, and even more so in a social and political context openly adverse to such efforts. Despite the potential importance of some of these projects for promoting sustainable development and conservation in tropical forest

ecosystems, little documentation and analysis of these experiences exists to guide community development and resource management efforts in the future. In response to this challenge, ACRI was organized as a means to gain a better understanding of the dynamics of community-based resource management in the Amazon and the factors that condition positive outcomes from such experiences.

The ACRI Process As we contemplated a design for the ACRI process, it quickly became clear that both the practice and the theory of CBNRM must integrate a broad range of concerns: those of both the social and natural sciences, of development practitioners, of public policy specialists and advocates, of conservationists and resource managers, of local communities and of the technical specialists from the NGOs working with them. This diversity of underlying concerns gives the field of CBNRM its richness, but at the same time it creates an enormous challenge to bridge the different perspectives and integrate them into a deeper understanding of its overall complexity.

At the same time, our area of study, the Amazon Basin, is both enormous⁷ and characterized by a complex arrangement of very diverse social and ecological realities⁸. The legal and political context for community-based resource management differs from one country to another. It is our impression, for example, that while the more explicit legal framework governing access to and use of natural resources developed in Peru during the 1970's is being weakened, to some extent the trend in Brazil is going in the other direction.⁹ At a more continental level, the historical, cultural and linguistic gulf that has separated the Andean Amazon from the Brazilian Amazon is not only large, but very real; perhaps its most concrete expression is the relative absence today of communication and exchange between the upper and lower Amazon. Yet, at least from a more global environmental perspective, both parts of this duality – upriver and down river-- make up an inseparable whole.

⁷ The area defined as the “legal “ Amazon of Brazil covers 5 million kms² ; the Peruvian Amazon covers 750,000 kms².

⁸ There are at present an estimated 200 ethnically different indigenous peoples inhabiting the Basin along with a large population of riverine fisher folk, traditional extractors of forest products, and modern colonists and cattle ranchers all of different origins. There have been many attempts to classify the Amazonian ecosystems. Pires and Prance (1985) give four major categories of ecosystems based on vegetation type with 24 different sub-types among them. Sanchez (1987) has listed 12 major soil types (USDA system) represented in the Amazon.

⁹ ACRI will be conducting parallel studies of the legal and political contexts for CBNRM in Peru and Brazil.

ACRI is attempting to bridge a number of these different concerns. ACRI's approach is multi-disciplinary: the research questions, the working hypothesis and the methodology developed in a group process reflect our conviction that CBNRM is conditioned by both social and environmental factors. For this reason, each research team is made up of one person from the social and one from the natural sciences. The Steward's Committee has members from the ecological, biological and earth sciences, forestry, geography, political science, anthropology, economics and law.

But at the same time, ACRI's concern is not purely academic. We have a commitment to use scientific rigor and methods to help us produce a better understanding of our subject and more effective counsel and technical support for those designing and implementing CBNRM initiatives. Witness to this concern is ACRI's sponsorship by a unique partnership including an institution dedicated to scientific research on the role of the world's forests in global climate (Woods Hole Research Center), one dedicated to development and relief among the world's poor (Oxfam America, Inc.), and two dedicated to research and problem-solving in the environmental and social aspects of resource use (IPAM and IBC). The four institutions share a concern for the sustainable and more equitable use of natural resources in the Amazon Basin. In many cases, members of the ACRI research team and the Steward's Committee combine academic skills with a dedication to applying them in a conservation/development context. Through the Steward's Committee and the case studies, ACRI is linking itself both to members of the university and NGO communities directly engaged in CBNRM project implementation in both Brazil and Peru.

Case Study Selection ACRI made an important distinction at the beginning of the process between "implicit" systems of management and "explicit" systems of management.¹⁰ The former are defined as those systems that are based on tradition and custom. An example would be the traditional agri-silvacultural systems for soil and forest species management using slash-and-burn techniques for family gardens derived from indigenous amazonians. The more explicit systems are the result of an intentional process of linking institutions and actions with specific management outcomes. In addition to their intentionality, these systems take place within the context of the market economy and often have a collaborative relationship with outsider actors from the university or NGO community or from the government. The ACRI study is interested in identifying and analyzing

conditioning factors for positive outcomes in these latter, explicit systems. ACRI recognizes that the implicit and explicit systems often co-exist within the same community and that the line that separates them may not be easy to define.

ACRI made another important decision at the beginning of its planning to take into account for its case studies explicit management initiatives in both the *varzea* and the *terra firme* ecosystems¹¹. Two factors lead to this decision: 1. the sponsors of ACRI were particularly interested in *terra firme* ecosystems and their management given their prior commitments in research and project support, but confronted a lack of good, long-term cases for study and 2. because of a longer history of “explicit” fisheries management in the *varzea*, there is a greater range of interesting cases for study compared to *terra firme*. Two sites were selected in mid-1999 for case studies in *varzea* ecosystems, one along the Tahuayo River near the Peruvian city of Iquitos, and a second in three communities on the *varzea* near the Brazilian city of Tefé. Field work is underway in both of these sites. These cases are described in detail on other papers in this panel.¹²

The criteria used for selecting these sites include the following:

1. there exists a group of domestic units that constitutes a community and functions as such;
2. the community has implemented an explicit system for management of fisheries in lakes;
3. the lakes fall within the jurisdictional limits of the community (whether or not these are recognized officially);
4. the management system was first implemented at least ten years ago;
5. the community accepts that ACRI carry out a case study among its members, and its members are willing to participate in different aspects of the study;

¹⁰ This distinction is similar to that made by Ostrom *et al.* (1999: 279) between management systems based on “evolved” norms and those based on deliberately established norms.

¹¹ *Varzea* ecosystems are those located within the floodplains of the major river systems whose annual flooding cycle inundates a major part of the land area during part of the year. Fishing is a major activity in communities of these ecosystems. *Terra Firme* ecosystems are those located in the uplands that are not subjected to annual or even occasional flooding. Hunting and extraction of forest products are major activities in these areas.

¹² See Pinedo, D. and P. M. Summers. “Community-based Natural Resource Management as a Non-linear Process: A Case in the Peruvian Amazon *Varzea*”. IASCP, Bloomington, May 2000; and Oliveira A.C. and L. H. Cunha. “Community Management of Floodplain Lakes of the Middle Solimões River, Amazonas State, Brazil: A Model Of Preservation In Transformation”. IASCP, Bloomington, May 2000.

6. if an outside agency is involved in delivering technical or other support to the community, it also accepts the ACRI study and is willing to participate in different aspects of the study; and
7. it is considered a plus rather than a requisite if others have conducted research in the community or in the immediate area prior to ACRI.

The ACRI team is in the process of searching out and selecting sites for two *terra firme* case studies. Similar criteria will be applied to that selection process. The selection process is focusing on communities in Acre (Brazil) and Madre de Dios (Peru) that are managing a forest product (for example, timber, rubber or brazil nut). Given the dearth of mature CBNRM initiatives in *terra firme* ecosystems in Brazil and Peru, we may have to be more flexible in the criteria we apply regarding the length of time that the initiative has been on-going. Work is expected to begin on the second case study in May-June of this year.

Eight cases will be selected for rapid assessments following similar criteria. Some cases may be chosen from Amazonian countries other than Brazil and Peru, particularly if they offer a time depth greater than a decade.

II. The Conceptual Framework, Research Questions and Methodology of ACRI

Can We Avoid The Tragedy Of The Commons? Garrett Hardin's seminal essay entitled "The Tragedy of the Commons" published over thirty years ago rekindled an important age-old debate about the limits and consequences of individual liberty in the context of the commons (Hardin 1968). Furthermore, it inspired two generations of scholars to carry out research in many parts of the world to put to test Hardin's basic premise that, in a commons situation, when individuals give free reign to their self interest, as he assumed to be both natural and rational for them to do, the result is ruin for all concerned.

There have been two fundamentally different reactions to Hardin's piece. On the one hand, political ideologues of both the left and the right have used his powerful metaphor widely to justify the further demise of the commons. Because blame for the tragedy was placed on communal property and usufruct rights themselves, the solution proposed by the left was to convert these rights into

public or collective rights under the state while that proposed by the right is to individualize them as private property¹³ (McCay and Jentoft 1998; Ostrom *et al* 1999). From either perspective, the ideological and practical impact of Hardin's metaphor in this respect was widespread. We must remember, after all, that his article was published at the height of the Cold War, when collective economies/ideologies and capitalist economies/ideologies were at war with each other.

A second reaction was to mobilize scientific resources to examine a fundamental question raised by Hardin's article: is the tragedy inevitable? A diversity of critical replies have come forward over the past thirty years, some of which Hardin himself has accepted (Hardin 1998). Stemming from this second reaction, a general consensus has developed among these researchers that tragedies of the commons are real, though not, as Hardin suggested, necessarily inevitable (Ostrom *et al* 1999:278; McCay and Acheson 1987).

Cirancy-Wantrup and Bishop (1975) published an early criticism of Hardin in which they argued that "common property rights" over a resource are different from "no property rights" over a resource: the former is subject to rules and regulations among the co-proprietors or users regarding access and use while the latter is characterized by no rules and regulations. This distinction is fundamental for clarifying the dynamics of the commons and for answering our question. As analysis by scholars and practitioners progressed, this situation of "no property rights" became more widely known as "open access" and was contrasted with group (common, collective) property, individual (private) property and government (state, public) property (Bromley y Cernea 1989; Berkes *et al* 1989; Ostrom 1999; and Rose 1994). This clarification lead some of Hardin's critics to distinguish between a "managed" commons and an "unmanaged" commons (Hardin *ibid.*) arguing that while the tragedy may be inevitable in an unmanaged commons, it was not so for a managed commons. Assuming this to be the case, the central question for scholars then became: what conditions are necessary to prevent the tragedy of the managed commons?

¹³ For example, the U.S. conservation movement during the 1960's and 70's pushed hard for strengthening public control over landscapes and resources determined to be of particular importance; during the same period in Latin America, virtually all natural resources (water, sub-soil and forests among them) were nationalized. Today the pendulum has swung to the other side. The powerful idea that the rational use of collective resources necessarily brings ruin to all was perfect fuel, for example, for the drive, initiated in the early 1980's, for liberalizing the world's economies, privatizing the earth's natural resources (that is, converting them into marketable commodities) and ending a century of Marxist-oriented social experiments. In this case, neo-liberal policy makers view all common property (both state and private) as anti-economic. The current discussion around these issues in Peru, in the case of forests and water for example, centers on how far the privatization of publicly owned natural resources should go, not on whether or not they should be privatized.

A second critical advance in this field came with the conceptual distinction made by Ostrom and Bishop between the system of property rights over a resource and the resource system itself. Ostrom agrees with this separation; she argues for using the term *common-pool resources* defining them as those natural and human-constructed resources in which a) it is difficult to exclude other beneficiaries, and b) exploitation by one user reduces the resource available for others (Ostrom *et al* *ibid* p. 278). McCay also accepts this theoretical advance, but stresses that the difference is more between the social institutions that evolve around the use of the resource (that is, the way people choose to relate to each other in relation to the resource) and the characteristics of the resource itself (Berkes *et al* 1989; McCay and Jentoft 1998: 22).

At this point, the critics of Hardin diverge over more fundamental philosophical, and without doubt in some cases, ideological, perspectives regarding where emphasis should be placed for the failure of the managed commons (and consequently where emphasis should be placed for resolving the failures): is it a problem of the individual or one of the society? This debate is one that has fascinated political philosophers at least since the era of Plato, and probably long before that.

One approach, grounded in the philosophy of the eighteenth-century rationalist school, looks for explanations for problems of the commons in the actions of individuals and the choices they make (Moran *et al* 1998; Ostrom 1990). The fundamental assumption here, as in Hardin's own analysis, is that each individual, as the basic building block of society, always acts rationally to enhance his self interest and to maximize his gains. Therefore, it is assumed that each individual will attempt to harvest a larger share of the common resource than others while passing on to others the cost for maintaining the commons. Thus from this perspective, "free-riding", as an individual's rational choice, is the central problem for the management of a common-pool resource. The central question for researchers, then, is what factors influence an individual's choice to respect management regulations or, on the other hand, to free-ride. Ostrom's pioneering work has given this perspective perhaps its broadest interpretation by looking at the impact of both institutional arrangements and contextual issues on an individual's choice to free-ride or not. An important

conclusion of her work is that the failure of the commons can be avoided by improving the incentives to the individual users for choosing not to free-ride.

A second approach, grounded in a variety of schools of thought that arose in critical response to the rationalists and their economic godchild, liberalism, argues that individuals do not make choices in isolation, but rather act in concert with others in a social unit (a community, for example) that has attributes of its own beyond the sum of its individual members. Society, in this Durkheimian sense, is grounded in a moral order shared and reproduced by its members, whose behavior in large part is governed by that order.¹⁴ From this perspective, the failure of the managed commons is a direct consequence of a community failure, that is, the weakening of the social bonds among the members of the social unit that permit them to enforce their shared moral order. Communities fail for many reasons. McCay and Jentoft, following Giddens (1994), suggest that an important reason is the process whereby the use of natural resources is “disembedded” from local social relations. As a result the “communities lose critical points of control over both economic matters and governance.” (McCay and Jentoft 1998:24)

I am reminded of Juan, a young Amuesha from Peru, who once confided in me that he believed his people constituted a more coherent and stronger society than that of the non-indigenous peoples around him (Smith 1982). His discourse clearly reflected his recognition of the legitimacy and moral strength of his ethnic community. A few years later, as head of his local community, Juan accepted a personal bribe from a local timber company in exchange for allowing the company to remove the standing timber from the community’s forests. Sadly, instead of heeding to the moral authority of his community and the limits that his community attempted to impose on his actions regarding common resources, he chose to exercise his own individual self interest. It took the community several years to react to this and exercise its moral authority. There was no single act of authority or decision taken by the community assembly, rather it was a slow cumulative process of social pressure that eventually led Juan to move out of the community. Aware that he was criticized for his actions even beyond his own local settlement, he moved with his family to an individual parcel of land outside his ethnic territory altogether.

¹⁴ For a criticism of this approach see Agrawal 1997 and Leach *et al* 1999.

Those looking at the dynamics of the commons from a more individualist perspective would focus their questions on the factors that influenced Juan's choices: why did Juan choose to ignore the common interest and accept the bribe? Was he under economic pressure at the time? Did he judge it to be in his best economic interest? Others approaching the commons from the more social perspective would focus their questions on the failure of the community to stop the actions of Juan and the lumber company before the forests were felled: Why was the community so slow to react to the threat to their forests? Did the community have institutions capable of dealing with this kind of situation in the first place? Or were the community institutions already weakened by other internal or external influences?

As the ACRI process matures, we find ourselves struggling with these different perspectives, and with the nature of the relationship between the individual and his community within the context of a commons. Juan was well aware of the moral authority of his community, but chose to ignore it in favor of his personal interests. His transgression of the social norms was met with social disapproval which eventually forced him out of the community. As this example suggests, both the individual and the community are important actors in any social drama; the key to understanding the drama is not in one or the other, but rather in the relationship between the two.¹⁵ The individual makes choices continually about his best interests. His interests and needs may or may not coincide with those of his community or the larger society at any given moment. But his choices are not made independently of society; they are, in fact circumscribed by society. That very circumscription creates a dynamic tension between the individual and society through which both are obliged to evaluate continually the degree of "mutual fit". The commons is a social stage where we can observe this dynamic tension in ultra-sharp focus.

Marcel Mauss' insight into the role of reciprocity in the gift economy was a major contribution to our understanding of the link between the individual and society around the globe.¹⁶ He uses examples from ancient and present day societies to show that giving and receiving are obligatory and complementary parts of a system of total services where "each gift is part of a system of

¹⁵ Ostrom, in a recent critique of rational choice theory, views this dynamic relationship in this way: "Our evolutionary heritage has hardwired us to be boundedly self-seeking at the same time that we are capable of learning heuristics and norms, such as reciprocity, that help achieve successful collective action." (Ostrom 1998: 2) We heartily agree with Ostrom regarding "the futile debate over whether structural variables or individual attributes are the most important". (Ibid. 3).

¹⁶ This discussion on reciprocity is based on Smith and Wray 1996 and Smith 1996.

reciprocity in which the honor of the giver and recipient are engaged." (Douglas 1990: viii) It is a total system because everyone in the community along with the status of their spiritual and material possessions is involved. Such a system is based on the simple rule that every gift must be returned.

Within the logic of the gift economy, it is the enhanced honor and status of the individual giver and receiver that drives the system. For example, it may be the desire to establish an alliance for political purposes, or one's need to secure a permanent source of salt- that is, the incentive of individual self-interest - which fuels this total system of exchange. But, unlike the modern market economy, the grand purpose of this total system is not the enhancement of the individual, but rather the strengthening of bonds among individual members of society.

By generating a perpetual cycle of exchanges, the gift economy binds all members of a local community through their reciprocal obligations to one another. The beauty of this ancient practice is that, by linking the long term security of each individual to the strength of their bonds with the rest of their society, it goes much further than the modern market system to resolve the fundamental tensions between the individual's desires and the needs of his society. In this system of reciprocity, the more that individual self interest drives the gift economy, the greater are the bonds of mutual indebtedness linking individuals to each other.¹⁷

In a system of generalized reciprocity in which individuals act without the expectation of an immediate and specific return, trust is particularly important. This system works, according to Mauss, because there exists a community moral order, enculturated in community members from infancy, that reinforces the obligation to reciprocate. Therefore, each member of the community assumes that the other members will act in the same way and fulfill their obligation to reciprocate in the future. This element of trust at such a basic level is the foundation for a system of generalized reciprocity and for the existence of both community and community-based

¹⁷ However, we do not mean to imply that some kind of idyllic peace reigned over the Amazon before the arrival of Europeans. Ethnohistory and modern ethnography are clear about the intensity of feuding and warfare which has long existed among indigenous and non-indigenous Amazonian societies. What is not clear is whether there was always a material basis for the conflict. Lathrap (1971) writes of the centuries long conflict between the Cocama and the Shipibo-Conibo peoples for access to the fertile flood plains of the Ucayali river basin. During the rubber boom, Ashaninka and Piro raiding parties exchanged young captives to the rubber barons for shotguns and other scarce goods; they were the terror of the upper Ucayali basin for many decades (Chevalier 1982).

management. It is this form of reciprocity that is commonly found in small, traditional Amazonian communities including those of indigenous peoples, *ribereños* and extractivists.

Returning to our earlier example, Juan was tied to the other members of his community through kinship and reciprocal exchange obligations. He (and through him, the timber company), in fact, made a gesture of reciprocation with his community by obliging the timber company to use their road-building equipment to dig out and flatten a soccer field for the community. The community accepted this at first. But as they witnessed the greed of the timber company who not only removed every commercially valuable tree from their forests, but left the forest itself in ruin, their trust of Juan dissolved. In the end, by breaking all relations of reciprocal obligation with him, Juan was socially isolated from the community.

The concept of reciprocity organized into a social system, so central to our understanding of the dynamics of rural societies, has been largely absent in the discussion regarding collective action and the management of the commons. This is particularly worrisome given its role as a key source of social glue for binding individuals into community. Ostrom introduced a discussion of reciprocity as “a family of strategies than can be used in social dilemmas”¹⁸ into her theoretical approach fairly recently; for example, she writes: “Substantial evidence has been accumulated that humans inherit a strong capacity to learn reciprocity norms and social rules that enhance the opportunities to gain benefits from coping with a multitude of social dilemmas” (Ostrom 1998:10). While we consider this an important theoretical advance in the study of collective action and common property, it is important to underline the concept of reciprocity as a system of social relationships based on mutual giving and indebtedness. We do not view reciprocity as a set of norms that an individual can elect use or not when advantageous as Ostrom seems to suggest.

As Putnam *et al* (1994) argue, generalized reciprocity is an essential part of a community’s social capital and underlies their ability to take collective actions. Communities that maintain a strong base of reciprocal relations are therefore likely to be more successful in managing their common

¹⁸ She also considers reciprocity to be “an especially important class of norms” that individuals choose to use or not: “All reciprocity norms share the common ingredients that individuals tend to react to the positive actions of others with positive responses and negative actions of others with negative responses.” (Ibid.:10)

resources than those with weakened reciprocal relations. Elsewhere we have looked at the impact of the market economy and its imperative towards individual accumulation on indigenous Amazonian communities (Smith and Wray 1996). We argued that in those societies moving from the gift economy into the market economy, there is a great deal of underlying confusion about values and norms for managing economic and community life. Besides the general deterioration of traditional values and beliefs, many indigenous Amazonians are confused about when these values are applicable and when they are not. Is cash income subject to demands of generosity and reciprocal exchange? Do I have any claim to my brother's cattle? Are there any limits to private accumulation of money and market goods within the local settlement? There is ambiguity in every cultural system, but generally each society has its judges and arbiters who interpret norms, values and their precedents as a way of keeping them up to date and meaningful. This kind of social capital seems to be weakening throughout Amazonia.

Research Questions for ACRI¹⁹ As we mentioned earlier, ACRI distinguishes two kinds of resource management systems among rural populations of the Amazon Basin. Some are based on tradition and custom, while others are the result of a conscious process of linking institutions and actions with specific management outcomes. It is these latter, more explicit systems that we call CBNRMs. Ostrom (1999: 279), from a more institutional perspective, makes a similar distinction between systems with norms that have evolved over time and systems with deliberately established norms. The ACRI study is interested in identifying and analyzing conditioning factors for positive outcomes in these latter, more deliberate systems.

Underlying this conceptual differentiation lies another distinction between more traditional Amazonian communities (many, if not most, of which have indigenous roots) and more recent communities formed through the process of migration and colonization of the Amazon. The former are characterized by an underlying moral order based on the norms and values of a system of generalized reciprocity. Depending on the location of these communities and the history of their interaction with the regional market economy, this underlying moral order can be characterized as anywhere along a scale from well preserved to thoroughly weakened.

In general, these communities practice what we call implicit management for some of their resources (including the widespread system of alternating garden plots with secondary-forest fallows) with norms that have evolved over time and have been assimilated into the culture and moral order of the community. On the other hand, recently formed communities of migrants are communities in formation; they can be characterized as having no or a very weakly developed system of reciprocal relations among their members and, depending on the origin of their members, occasional or no implicit systems of resource management.

In much of Amazonia, CBNRM's appear to have been created largely in response to market-related internal or external pressures on key resources which make it necessary to develop more explicit rules regarding their use. Even so, where a system of reciprocity is weakened, in formation or absent, we believe that the costs involved in establishing and maintaining a CBNRM initiative will be very high; as a result the CBNRM under these conditions will be very fragile.

In these explicit systems, the local participants and the outside actors intend to accomplish both socially- and ecologically-oriented goals that may include some of the following:

- improve the quality of life for the local people participating in the CBNRM strategies;
- obtain economic benefits;
- maintain the integrity of the local ecosystems;
- maintain viable populations of native species in their natural assemblages;
- strengthen their shared institutions for participatory decision making, and for efficiently implementing and enforcing the agreements reached.

For the Amazonian context, we understand community-based natural resource management (CBNRM) as a process in which members of a user group (defined as a group of domestic units who live in close proximity and share some common institutions) depend on a common resource, a group of resources or a landscape and choose to develop explicit regulations for the use of that resource in a way that 1. involves some form of collective action and 2. is both socially viable and ecologically sustainable over the long term.

¹⁹ The following working definitions and research questions were developed in a group process among the members of the research team and the Steward's Committee.

We recognize that a user group may coincide with an entire community in itself, may be part of a larger community or may be made up of families from different communities. In this and other contexts, it is important to note that human communities, as products of historic processes, are extremely variable and can exist in multiple levels, one nested inside another. Because of the dynamic relationship between each individual member and the community as a whole, communities can change composition and structure from one generation to the next. Community institutions, however, tend to be more stable over time.

Following Ostrom's definition of a common-pool resource, we agree that in a CBNRM context, it is difficult for the user group to exclude any of its member households from the commonly-used resource as each member depends on the resource for its livelihood. At the same time, we recognize that all renewable natural resources have stocks limited by their reproductive rates; non-renewable resources have finite stocks with no possibility for reproduction. For that reason, at any given moment, the more one household consumes of a given resource, the less there is for other households to consume.²⁰

In the Amazon Basin, as in all national societies, there is a complex relationship of coexistence and interaction among the public, private/enterprise, and private/community property regimes for access and management of natural resources. We observe two tendencies at this time.

1. There is a growing trend towards a concentration of control over and benefits from natural resources under the private enterprise sector and the public sector; this goes hand-in-hand with a growing indifference vis-a-vis the community sector. ACRI views as a positive result of a CBNRM process the strengthening of efforts to decentralize resource control and management towards local institutions for community action, a process that would help establish a more equal balance among the three modalities of resource access and management.
2. Given the lack of capacity of the state to exercise control over public property, especially in remote areas of the Amazon Basin, and given the lack of governmental support for community property regimes, there is a growing tendency for resources under both of these

regimes to devolve into an open access situation in which “the early bird gets the worm” leading to a growing rhythm of conflict and violence over resources.

These trends fuel the growing gap between the rich and poor, while at the same time lead to an impoverishment of the global natural resource base.

The ACRI research initiative has set up for itself two sets of research questions with their subsequent hypotheses.

Research Question 1: What are the most effective indicators for determining and measuring the relative success of a community-based resource management effort?

The first set of questions revolve around the definition of “success” in the context of CBNRM. A commonly used definition involves such terms as “viability” and “sustainability”; however, these terms also need defining and clarification. For example, we might suggest that two important indicators of success in a CBNRM initiative may be the viability of the effort over the long term and a measurable reduction in the deterioration of the resource stocks and quality as a result of the management activities. Viability generally refers to the capacity of an entity or an initiative to survive under given conditions. Yet it is conceivable that a CBNRM initiative could be socially and politically viable, and yet the economics of the project bring it to ruin. By posing this question at the outset, we oblige ourselves to use the research process to establish a more rigorous definition for “success” while at the same time we develop instruments for measuring the impact of the resource management.

The second set of research questions addresses the factors that condition positive outcomes in a CBNRM initiative. We posit that a deliberate effort to manage natural resources should be conceived of as a process over time which can be analyzed in discreet phases: we propose a minimum of three phases that include 1. an initial phase for planning, design and putting the initiative in motion; 2. a short-term phase in which the initiative must overcome a series of difficulties of an operational nature; and 3. a long-term phase in which the initiative consolidates

²⁰ These two conditions, “difficulty of exclusion” and “subtractability”, correspond to Ostrom’s definition of a common-pool resource.

itself and its institutions mature.²¹ Factors that condition positive outcomes then will depend on what phase of the process the effort is in at any given moment. For that reason, we suggest separating the following proposed factors into three different research questions covering each of these three phases.

Research Question 2: What preconditions are necessary for initiating a community-based resource management effort such that it is able to begin functioning and to move into a short-term phase?

Working Hypothesis #2.1: The domestic units of the user group share one or a combination of the following:

- 2.1.1 a perception that the integrity of a resource, a group of resources or a landscape is threatened by productive or extractive activities being carried out by outsiders or by themselves; and/or
- 2.1.2 a concern for controlling the threatening activities and/or regulating access and use of the threatened resource or area; and/or
- 2.1.3 a perception of opportunity to be gained through resource management based on collective action.

Working Hypothesis #2.2: The members of the User Group have defined and agreed upon an area or a natural resource for management. This pre-condition raises a series of related issues about the role of property relations and tenure arrangements regarding the resource to be managed that the ACRI process must keep open as we look at the case studies. For example, to what extent are property rights and/or tenure arrangements to the resource to be managed, whether or not these are officially mandated through a state-sanctioned titling process or locally recognized, a conditioning factor? Is there a minimum degree of resource rights security required to initiate and carry on a CBRM effort? Does the type of property rights and tenancy arrangements influence the capacity to achieve longer-term positive outcomes from resource or landscape management.

²¹ The paper on this panel by Pinedo and Summers propose viewing CBNRMs as non-linear processes, and thus question our initial assumption of three successive and progressive phases.

Working Hypothesis #2.3: There exist sufficient stocks of economically valuable natural resources to be managed.

Research Question 3: Once initiated, what factors condition the ability of a Users Group to carry out a community-based management system in a way that produces positive outcomes in the short term?

Working Hypothesis # 3.1: The members of the User Group have developed networks for reciprocal exchange, communication and shared institutions among themselves that permit them to reach agreements and resolve problems regarding resource use and management in a participatory and transparent manner. These same institutions and the mechanisms that derive from them should allow the community to efficiently implement and enforce the agreements reached.

Working Hypothesis # 3.2: The members of the User Group perceive that the benefits they receive are greater than their investments in the community-based management system. These benefits may be monetary and derived from the sale of managed resources. This implies the need for favorable market (price-cost structure) and marketing (accessibility) conditions for at least one sector of the CBRM production at all times. The strategies based on diversity and zoning are important safeguards against the variability of market conditions. The benefits may be non-monetary, reflecting for example improvements either in subsistence aspects of their economy or in the health of the resource or ecosystems under management.

Working Hypothesis # 3.3: The User Group be characterized by one of the following (in order of decreasing positive impact):

- 3.3.1 the User Group has a tradition of collective action; or
- 3.3.2 the User Group has some experience in activities requiring collective action; or
- 3.3.3 some persons, part of the User Group, have individual experience in activities requiring collective action.

Research Question 4: What factors condition the ability of a Users Group to carry out a community-based management system in a way that permits the CBRM effort to endure and produce positive outcomes in the long term?

Working Hypothesis #4.1: The management system implemented by the User Group permits the sustainable use of the landscape or resource under management. We posit that of central importance to this management system is a "feed-back" mechanism (i.e. monitoring component) including the institutional arrangements that allows the User Group to learn from its experience in order to better respond to 1. harvest rates that exceed renewal rates (natural or human-assisted) and 2. resource use practices that impoverish local ecosystems.

Working Hypothesis # 4.2: The resource management system takes into account the diversity of species and ecosystems found in the local landscape. The conditioning factor contemplates one or a combination of the following elements:

- 4.2.1 the members of the User Group seek to diversify their economic strategies for production, extraction, consumption, exchange and sale, and/or
- 4.2.2 they seek to use and manage a diversity of natural resources, and/or
- 4.2.3 they recognize the differences in ecological and productive potential within their area and zone their economic activities according to those differences in order to optimize resource use.

Working Hypothesis # 4.3: The members of the User Group gain confidence in their ability to manage their resources, their shared perception shifts from one that focuses on resource pressure to one that focuses on the greater opportunities offered by a community-based management system.

Working Hypothesis # 4.4: The community, as a whole, including the User Group, is developing its capacity to negotiate a relationship of cooperation based on mutual respect with institutions from outside the area to be managed . These institutions can contribute scientific and technical knowledge and other inputs for resource management not available locally. The need for strong and viable local organization to achieve positive management outcomes in the long term derives

in part from the fact these relationships may be characterized by an imbalance of power and dependence between the local people and their outside allies.

III. Methodological Challenges for the ACRI Process

As Garrett Hardin, himself said in a recent article in *Science* (v. 280, 1 May 1998): “It is easy to call for interdisciplinary syntheses, but will anyone respond? Scientists know how to train the young in narrowly focused work: but how do you teach people to stitch together established specialties that perhaps should not have been separated in the first place?” From the outset, the ACRI process has had to face these conceptual and methodological challenges: is interdisciplinary research really possible, and if so, methodologically speaking, how do we go about it?

As we began the group process of developing the research questions and methodology, we were soon confronted with differences among the group’s members on such profound issues as our conception of science and how we know what we claim to know. Some of the more profound differences can only be described by using such Whorf-Sapirian concepts from cultural anthropology as “world view” and “language”. People formed in the social and natural sciences view the world differently and use different languages to describe what they see. The ACRI process confronted an enormous task, one that is on-going, of constructing a common language of shared concepts, definitions and terminology that permit anthropologists, political scientists, sociologists, forest ecologists, geographers, biologists and foresters to communicate with each other.

Another important difference is the methodological approach: we have been replaying the age old debate between the quantitative and qualitative sciences throughout the ACRI process. The quantitatively-trained members argued that if we do not have a statistically significant sample, we will not be able to draw valid generalizations. Those trained in the historically-based disciplines argued for a narrow range of more deeply explored cases allowing us to better understand the specificities of CBNRM.²² We opted to combine the two approaches. For example four central

²² A similar debate is on-going within the common property community. See McCay and Jentoft 1999 for a discussion of “thick” versus “thin” approaches to the commons problems. According to them, “A “thick” approach calls for attention to cultural and historical specificity and suspension of overarching models although not the explanatory endeavor” (p. 24).

case studies conducted in-depth with at least 3 months of field work in each will be combined with a “shallower” look at eight other cases. In this way we hope to put to test in the eight evaluations the conclusions we draw from the four case studies.

Community institutions, especially when based on a generalized system of reciprocity, are crucial in a collective attempt to use resources in a more sustainable way. Many aspects of these institutions are not subject to a quantitative analysis. For that reason, we are using participant observation and lengthy personal interviews with community “gate-keepers” to establish an understanding of the development and current state of the community institutions for the CBNRM. However, we recognize that human memory is not only frail, but notably subjective and interested. How then do we reconstruct and evaluate a history of community management institutions, that in the case of El Chino may go back to 1976, when there is almost no documentary record?

An important step in this effort is to trace out the networks of reciprocal relations within the community, and especially among the resource user group, in order to understand how the system of generalized reciprocity functions and its relative health. The anthropological approach of participant observation in a given domestic unit is fundamental for understanding how reciprocity is played out in the daily lives of one family and how it links them to members of other domestic units. But we cannot extrapolate from one domestic unit to build a generalization about the health of generalized reciprocity for the whole community. Questionnaires about exchange relations that are well directed towards specific indicators can help. But in that case, we need to agree on what are the best indicators for a healthy system of generalized reciprocity: for example, does a strong tradition of community meetings for making decisions constitute a good indicator of social capital? Or do we need to analyze more closely the composition of participants in the community meetings? Is trust something we can measure using the results of a questionnaire? Questionnaires must complement continued observation and informal conversation about trust, reciprocity and compliance of norms at a broader level than the domestic unit; these, combined with a mapping out of kinship relationships, continue to be key strategies for developing conclusions in this regard. The only solution here is patience and time spent in the community.

Other quantitative data for diverse social components is also being gathered through questionnaires applied to each domestic unit. Themes covered in these questionnaires include community demography and migration patterns, property and tenancy of productive resources, general data on the calendar of production/extraction activities, attitudes towards the management efforts, participation in collective action and a large amount of data regarding quantities of managed resource harvested or extracted and the technology for doing so.

On the other hand, CBNRM initiatives will likely fail if they do not address the impoverishment of the resource base on which the community depends. ACRI underscores the natural resource base as both a critical measure of success and as a category of factors that condition the positive outcomes of CBNRMs. The nature of those conditioning natural resource factors, however, gave rise to a great deal of discussion and debate within the team. The problem was largely one of approach and scale.

One conservation-oriented approach to the Amazonian natural world focuses its attention on the impact that human occupation has had on the *natural* composition of plant and animal species, concluding that local people invariably produce alterations with potentially devastating long-term effects on the integrity of the ecosystem (Redford 1992; Terborgh 1999). In ACRI, we have explicitly accepted these alterations of the “natural” species composition of local ecosystems as an inevitable and (in the case of successful management) as a desirable outcome of CBNRM. For that reason, the case studies focus on those aspects of the local natural resource base that are most relevant to the long-term well-being of the human community. While our analysis includes the status and predicted trajectory of those selected species of fish, game or plants that the community manages, we go beyond this species-level approach to examine the impact of the CBNRM on maintaining forest cover, water quality, in preventing soil erosion, and in avoiding the impoverishment of local ecosystems, for example, through logging, forest fire, or destruction of lakeshore vegetation.

If we accept the natural resource base as a critical measure of the success of a CBNRM, then a major challenge for ACRI is to infer from the current situation what has been the impact of the

community management system on the resource base. To do so, we are combining an historical look at the specific resource under management with a broader, contextual look at other resources being used and possibly managed. For example, one approach is to compare our current “post-management” data on the state of the natural resources with similar “pre-management” data to infer what has been the impact of the management system. Is the resource disappearing, recovering, or static? On the basis of our analysis regarding the current status of these resources and their trajectory since before the CBNRM began, we can compare a community that is managing fish with a community that is managing forest products. For example, the depletion of a forest through slash-and-burn agriculture and its subsequent recovery through management measured with satellite images from different dates can be compared with the depletion and recovery of a fishery measured by comparing historical catch records, on the basis of the trajectory. A major challenge for ACRI is devising a way of doing this for resources and communities that have little or no historical baseline data on “pre-management” conditions, as is the case for the vast majority of Amazonian communities.²³

Together with this historical-comparative approach for the specific resource under management, we are also taking a broader look at other resource related activities in the community. We begin each case study with an on-site diagnosis of the critical issues related to all the natural resources on which the community depends. Which of these resources are threatened by current land- and water-use practices? What is the current condition of these resources? What are the trends? Interviews with community members engaged in these activities combined with remote sensing, field inspection and participatory mapping provide the basis for inferring these kinds of conclusions.

Other challenges for ACRI take us far beyond our individual cases of CBNRM. Science, for example, is becoming increasingly aware of the cyclical character of all aspects of the Amazonian system. Some elements of the seasonal cycles, rainfall and flooding regimes for example, have been examined and analyzed for years; other aspects remain virtually unknown. At the same time, the interaction of these seasonal cycles with the ecosystem processes is still not well understood at all. CBNRMs take place within these seasonal cycles and are likely affected

²³ For the case of El Chino we are fortunate in having a record of the daily fish catch in 1994.

by them.²⁴ A reconstruction of the yearly calendar of productive and extractive activities in the community is essential in this regards. Both data gathering and analysis regarding the historical comparison of resource use and management must take this seasonality into account in a rigorous way.

We are also becoming aware that seasonal cycles take place within much larger cycles that probably parallel the cycle of El Niño events. These macro- and mega-cycles, and their catastrophic impact, are only just coming to our attention. Three major El Niño events produced both record drought and flooding in the Amazon between 1982 and 1997. We do not understand what impact these events have at the species or ecosystem levels. For example, science is just beginning to study the impact of these cycles on the reproduction of different fish species. Experiments are currently underway to look at their impact on the ecosystem through drought-related forest fires (Nepstad *et al* 1999). How, we ask, do these larger cycles impact community use and management of natural resources. We wonder, for example, if the non-linear nature of the fisheries management in El Chino that took place between 1884 and present reflect in some way the three major El Niño events that took place during the period? Does the apparent increase in fish population (at least of some species) after the severe flooding caused by an El Niño event remove the incentive to manage community fisheries? On the other hand, if we had baseline “pre-management” data for the lake fisheries of Tefé and compared it with our data for today, does it really tell us anything if we do not know at what point of what cycle the natural system was in when both the baseline data and the current data were gathered nor how those cycles impact the natural system? These are major challenges ahead for the natural and social sciences attempting to understand the natural resource base and its human use in the Amazon.

We would like to conclude with a comment regarding our final challenge. ACRI expects to use its findings to strengthen CBNRM efforts in the Amazon on two fronts: through dissemination and discussion of the results and recommendations with community organizations, NGOs, funding agencies and government agencies; and through advocacy work to improve the legal and political framework for CBNRM. We are confident that the ACRI process will produce

²⁴ The seasonal flooding of the forests in the *varzea* floodplains is an important aspect of the reproductive cycle of many fish species. Both the geographical extent and length of time that the flooding takes place appear to impact fish population and probably attitudes towards management.

important lessons regarding CBNRMs. For these lessons to have an impact on practice, they must reach those institutional and community agents engaged in promoting and implementing local efforts to manage resource sustainably. In that regard, they must be translated from the academic discussions found in this paper into different languages, one that is comprehensible to local fishermen, one for middle level technical personal, one for those responsible for funding agency programs, and one for government officials. And these lessons must be delivered in a way that is not perceived as an imposition, but rather as part of an open dialogue among parties to a learning process. We must be sensitive to these issues as we move beyond the case studies to cases of practice.

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